

AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING

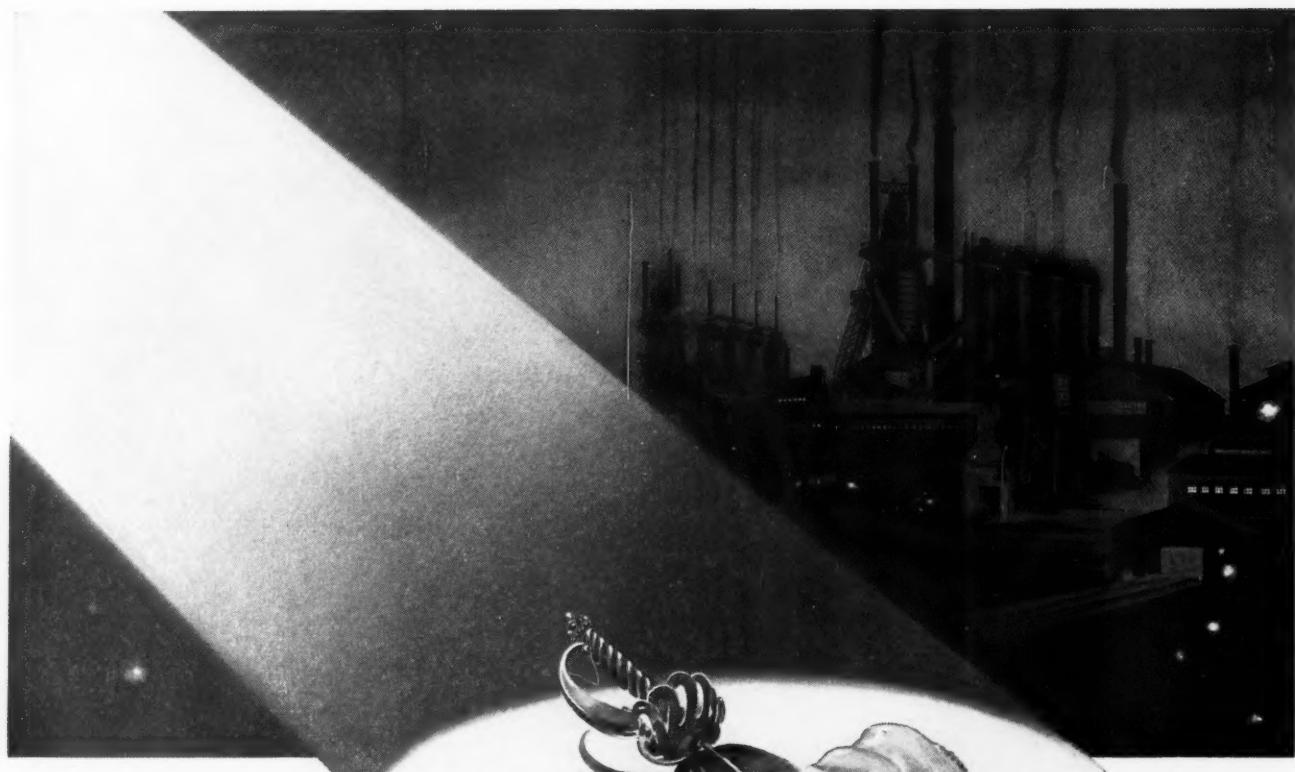


ESTABLISHED
1880

NOVEMBER
1935

THE AIR CONDITIONING SECTION

Page 23



A GREATER REPUBLIC STEEL CORPORATION *accepts the challenge of industry . . .*

With assets increased by more than \$40,000,000, with greatly enlarged reserves of northern iron ores, with advantageous terminal facilities on the Great Lakes and strategically located additional plants, a greater Republic Steel Corporation accepts the challenge of every steel-using industry.

The merger of Corrigan-McKinney Steel Company and Newton Steel Company with Republic Steel Corporation is one of far-reaching significance. Corrigan-McKinney Steel Company brings to Republic tremendously increased facilities for the production of high grade pig iron and steel. Newton Steel Company has long been an important source of supply for quality sheets.

Even before the acquisition of these companies, Republic was the world's largest producer of alloy steels, including the famous Agathon line, ENDURO perfected stainless steels and the new Republic Double Strength high tensile steels that are lightening the weight of nearly every type of transportation unit. Republic has been the sole maker of rust-resisting Toncan Iron for more than 27 years—the pioneer in the development of electric resistance welded pipe—the maker of Sil-con low-loss electrical sheets and coiled strip.

In addition to making these trade-marked products, Republic continues to occupy an important place among the producers of high quality plain carbon steels in practically all commercial shapes.

A greater Republic Steel Corporation accepts the challenge of industry—looks optimistically to the future—keeps pace with the increasing demand for ever better steels—steels lighter in weight—steels of greater strength—steels more resistant to corrosion and high temperatures—steels that strike a new note in beauty—steels more dependable, longer lasting and more economical.



Republic Steel
CORPORATION
GENERAL OFFICES . . . YOUNGSTOWN, OHIO

ALLOY AND CARBON STEELS
TONCAN IRON • STAINLESS STEEL
PIPE AND TUBULAR PRODUCTS
BARS AND SHAPES • PLATES
HOT AND COLD ROLLED STRIP
HOT ROLLED, COLD ROLLED
AND SPECIAL FINISH SHEETS
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NUTS, BOLTS, RIVETS, ETC.
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Invaluable Information for Every Furnace Man (No matter what line you now sell, you need this material.)

How to Sell and Figure Blower Jobs

The Easy Way to Sell—All kinds of "sales dope."

3 EASY WAYS TO FIGURE ANY JOB (Check and double-check)

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- NECESSITY OF VARIABLE SPEED.
- DATA ON NECESSARY CAPACITY WHEN A FURNACE BLOWER IS USED FOR SUMMER COOLING—Why you can't get results without special equipment.
- THE IMPORTANCE OF FILTERING—Useful information that will close sales.
- THE NECESSITY OF THE VISCOSUS OILY COATED FILTERS—What is wrong with the air washer.
- HOW TO JUDGE AIR CONDITIONER MOTORS.

RUSSELL ELECTRIC Co., Mfrs.
342 W. Huron St.

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FREE

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2. New Catalog showing a Full Line of Furnace Blowers.
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Here, revealed for the first time The "Naked Truth" about Furnace Blowers

YES, MR. FURNACE MAN, with this Free Material you can figure blower requirements, make estimates and recommendations quicker and better than most of the self-styled "experts." You don't need to take a course—you don't need to attend "school"—you don't need to spend a lot of time studying countless pages of abstract theory and meaningless figures that serve only to confuse the simple necessary facts. The manual gives all the facts you require—and the facts only, IN A FORM THAT YOU CAN USE.

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THREE BEAUTIFUL PHOTOGRAPHS

will close sales "where words fail." Every prospect will want to own one of these outstandingly beautiful Hold-Heet Units when he can actually see just how it will look. The Manual supplies all of the information you require to close these sales.

Send in the Coupon NOW

—Pin This Coupon to Your Letterhead—

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342 W. Huron Street, Chicago, U.S.A.

Send Free

*Note: Only supplied when your regular business letterhead or a full explanation shows you are entitled thereto.

Blower Sales Manual and Catalog.

* Dealer Price List.

* Set of 3 Large Photographs.

Send to

Name of Firm

Address

City, State

Name of Preferred Jobber

In This Issue

We believe that FHA, as revised to include "movables," is destined to reduce the amount of work our industry can hope to get. We express our beliefs in the editorial on page 11. Your comments are invited.

Large shops and small shops, in big cities and small towns, are turning to the fabrication of metal specialties as one means of keeping production on a level keel. On the west coast Dura Steel Products has developed national sales for household specialties. Read about their activities on page 12.

On page 16 we continue our series on methods of baffling furnaces when converting gravity furnaces to forced air. This article takes up cast iron, round casing.

Valleys are important in weather protection. Recommended design for water tight valleys is presented on page 18.

Sheet metal men will be interested in the description of the all copper house on page 20. The design calls for erection by our craft.

Part 2 of the Minneapolis heating, ventilating, air conditioning code is published on page 55. Organizations interested in promoting a code should read this ordinance carefully.

This month's Problem Corner (on page 57) contains some interesting questions. Perhaps you would like to comment.

From time to time, during the two years our series on automatic controls has been running, contractors have asked—"Isn't there some better place for the thermostat than on the wall?" Placing the thermostat bulb in the return air duct of a continuously running fan system is discussed in detail on page 29.

Perhaps you have wondered how fans and blowers are rated. S. Konzo explains just how it is done on page 32. If you have specific questions—now is the time to get your answer.

Our October cover showed an unusual fitting. Many readers asked—"what kind of a job?" The description and pictures is presented on page 36.

And another completely air conditioned hotel on page 30. Henry Ford is interested in this one.

AMERICAN ARTISAN

With which is merged

FURNACES
AND
SHEET METALS

Warm-Air
Heating

Covering All Activities in
Gravity Warm Air Heating Forced Warm Air Heating
Sheet Metal Contracting Ventilating
Air Conditioning

J. D. Wilder, Editor

Vol. 104, No. 11

November, 1935

Founded 1880

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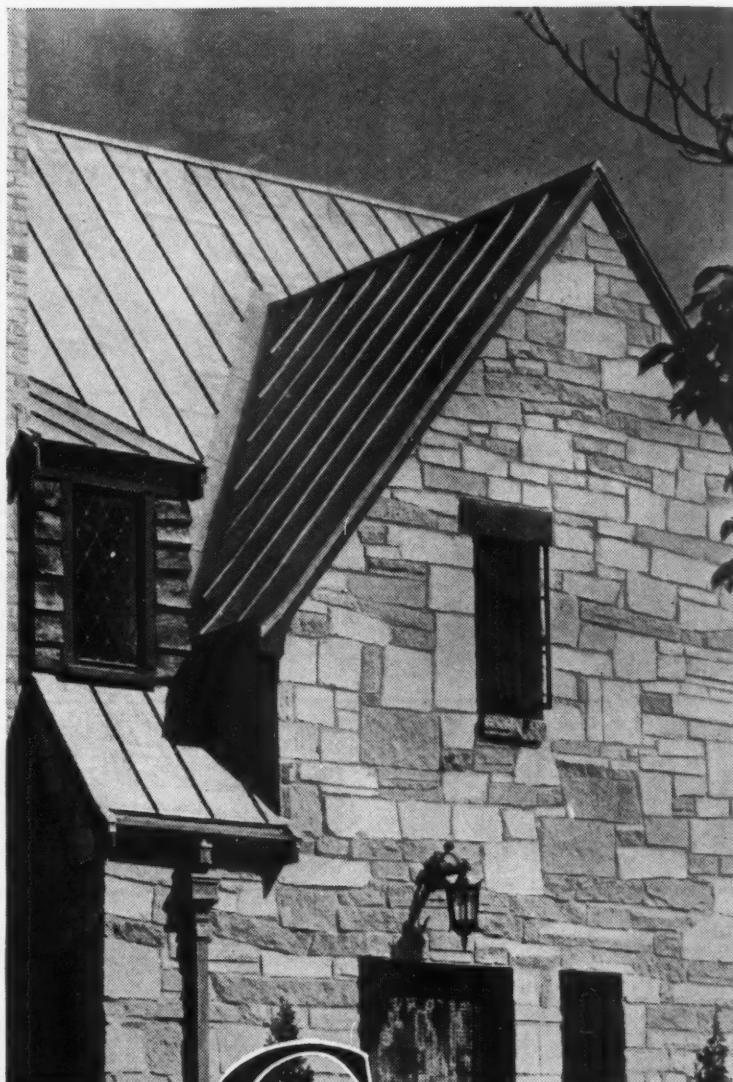
More than 7,000 Copies of this Issue are being distributed

Public Interest in
ANACONDA Economy
COTTAGE ROOFING
...means new business for YOU

INTEREST in the new Anaconda 10-oz. *Economy* Cottage Roofing (announced in the June, 1935 issue of this magazine) has been even greater than we hoped for. Hundreds upon hundreds of inquiries have come in from wide-awake homeowners and prospective builders.

Yes, the public is definitely interested in a roof of durable, *rustless* copper, costing no more than good quality commercial slate. The National Housing Act is doing its helpful part. Architects favor this new type of roofing. And our own advertising in American Home, House & Garden, House Beautiful and other magazines is being read in more than a million homes!

Distributors of Anaconda Copper carry Anaconda 10-oz. *Economy* Cottage Roofing. For price information on these new roofing sheets (which can also be furnished lead coated) ask your regular supply house. Cash in on the metal roofing opportunity that is yours today!



35124



Anaconda Copper
 THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut • Offices and Agencies in Principal Cities



FULL BLAST

The clouds are disappearing. Blotted out by belching smoke. For instance, in the Richardson & Boynton plants where everything is bustling activity as an avalanche of orders is being filled.

These orders come from experienced contractors, jobbers and dealers—men who know the worth of R. & B. heating units—men who know the value of R. & B. cooperation—men who know that Richardson & Boynton will back them to the limit.

During the slack years Richardson & Boynton looked ahead—not back. As a result, today finds us with plans for new improvements, innovations in heating and air-conditioning on

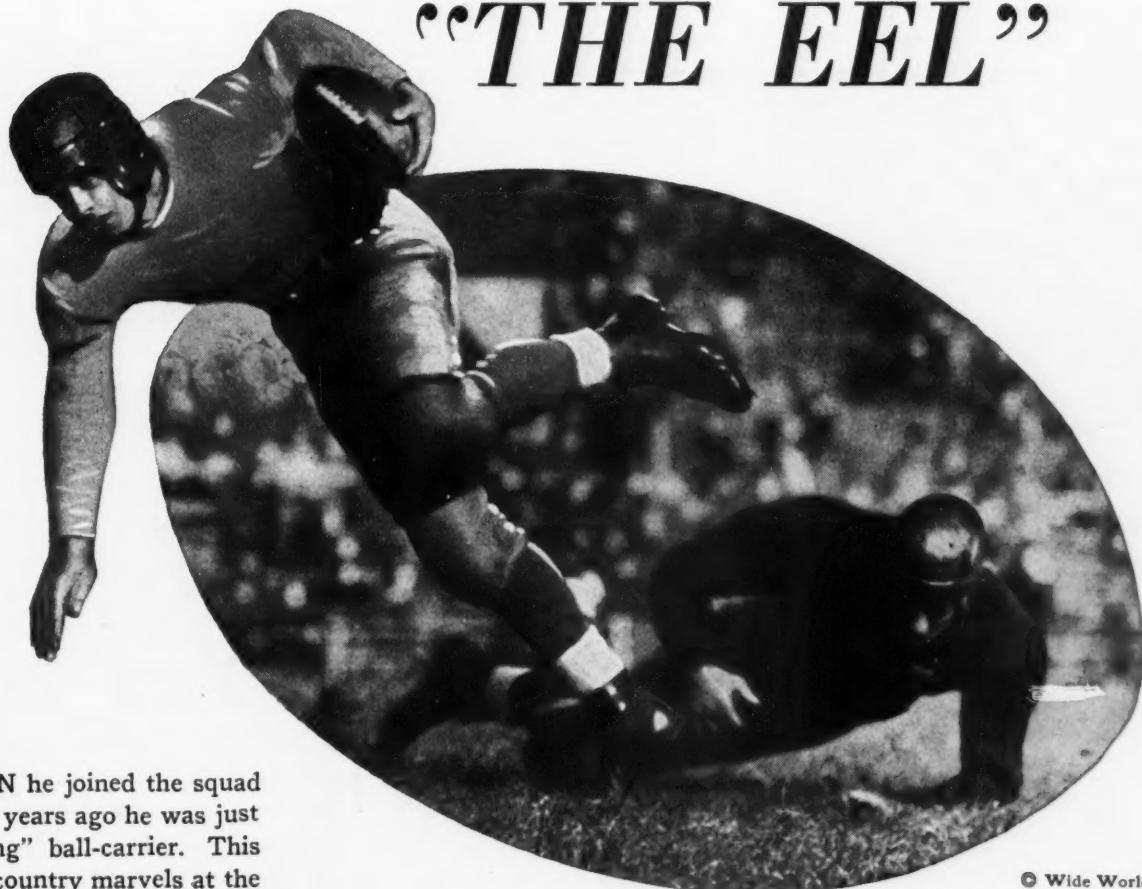
the drafting boards. As soon as they meet the rigid tests of quality and performance in R. & B. laboratories, they will be offered to the public.

In the meantime, Richardson & Boynton are going ahead to fill the promising needs of today—full blast!!

RICHARDSON AND BOYNTON CO.

244 Madison Avenue, New York City. Branch Offices in Principal Cities.

He's called "THE EEL"



© Wide World

WHEN he joined the squad two years ago he was just a "promising" ball-carrier. This season the country marvels at the way "the Eel" slips through tacklers. But it's no marvel to him. He remembers the long hours of practice it took to learn to spin, side-step, shift stride; and the bruises that built up his judgment and knowledge of tacklers. He'll tell you that EXPERIENCE, more than anything else, keeps him on his feet.

Experience makes a winning product, too, as sheet metal workers have learned by comparing genuine Parker-Kalon Sheet Metal Screws and imitations. The genuine product, resulting from Parker-Kalon's specialized experience of more than twenty years, gives uniformly perfect results in

contrast to the uncertain action of imitations that "look" the same. This is proof that it takes *experience*, in addition to wire and machines, to make Sheet Metal Screws that give uniformly perfect results. Because only such Screws will effect true savings in assembling sheet metal it will pay you to specify PARKER-KALON . . . the name that stands for EXPERIENCE.

PARKER-KALON CORPORATION
190 Varick Street
New York



PARKER-KALON
HARDENED ^{TYPE} A SELF-TAPPING
Sheet Metal Screws

PATENTED NO. 1465148



PARKER-KALON PRODUCTS ARE SOLD ONLY BY RECOGNIZED DISTRIBUTORS



The Busier You Are The More You Need Handy Pipe & Service!

Square duct-work of the most improved type for your finest jobs designed to save you money, both on its cost and on your labor cost a product of engineers who have spent a lifetime in heating and sheet metal work the "old reliable," unbeatable HANDY pipe for wall stacks from boot to head round pipe and elbows for warm air, cold air or smoke pipe

IN FACT EVERYTHING NEEDED IN
WARM AIR FURNACE INSTALLATIONS,

is ready for instant shipment.

If you will send us your plans, we will send you a FREE, ACCURATE estimate of all pipe and registers needed — and we'll be quick about it!

F. Meyer & Bro. Company
"The Handy Pipe People"

Peoria

Illinois

AMERICAN
SHEET AND TIN PLATE
COMPANY
PITTSBURGH
APOLLO BEST BLOOM

KEYSTONE
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AMERICAN
SHEET AND TIN PLATE
COMPANY
PITTSBURGH
APOLLO BEST BLOOM

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SHEET AND TIN PLATE
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PITTSBURGH
APOLLO BEST BLOOM

WORKABILITY

DURABILITY

SHEETS
*that will do
a better job
for you*

FABRICATORS and sheet metal workers know they can depend upon the reliability of AMERICAN products. These sheets are not only made right in every detail both mechanically and metallurgically—but they are backed by an organization whose service, research, and facilities combine to make this Company a dependable source of supply.

AMERICAN products are supplied in Black and Galvanized Sheets, Formed Roofing and Siding Products, Sheets for Special Purposes, KEYSTONE Rust-resisting Copper Steel Sheets, Tin and Terne Plates — also U S S High Tensile Steel Sheets, and USS Stainless and Heat Resisting Steel Sheets and Light Plates. Write for information and latest literature.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

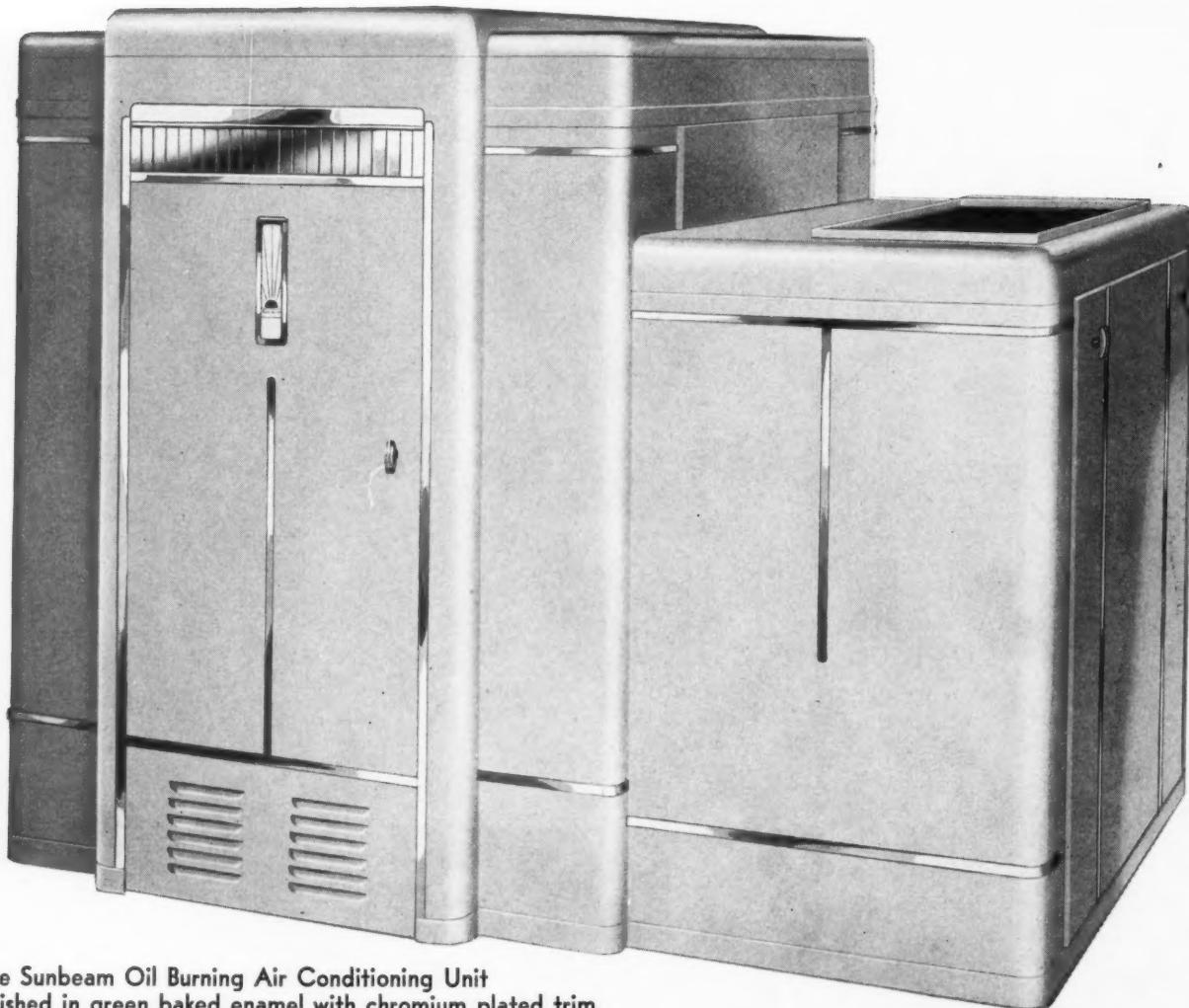
Steel Sheets are also manufactured in the South by Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.



Sheets and Tin Plates produced on the Pacific Coast by the Columbia Steel Company, San Francisco, Calif.

Sales Offices in principal cities. Export Distributors for above Companies — UNITED STATES STEEL PRODUCTS COMPANY, Hudson Terminal Building, 30 Church Street, New York, N. Y.

United States Steel  *Corporation Subsidiaries*



The Sunbeam Oil Burning Air Conditioning Unit finished in green baked enamel with chromium plated trim.

*Prepare for 1936 Profits With
the New*

SUNBEAM AIR CONDITIONING UNIT

Residential Air Conditioning has "arrived." Automobile manufacturers . . . household refrigerator manufacturers . . . electrical manufacturers and others have entered the air conditioning field to profit from the large and growing market that exists for this newest development in heating.

The Sunbeam organization, with a background of 50 years of valuable heating experience, enters the year of 1936 in the forefront of the manufacturing ranks—in the position of leadership that it has occupied since it successfully pioneered this new development.

The announcement of the new Sunbeam Oil Burning Air Conditioning Unit shown above—the most outstandingly

beautiful Unit ever placed on the market—is only one indication that the Sunbeam program for the coming year will assure the continuance of the Sunbeam position of leadership in the residential Air Conditioning field.

Alert, progressive furnace dealers will find the opportunity for substantial profits in the Sunbeam Dealer Proposition. The coupon will bring the interesting details.

SUNBEAM
AIR CONDITIONING UNIT

THE FOX FURNACE CO.

ELYRIA, O. DIVISION OF AMERICAN & STANDARD RADIATOR & SANITARY CORP.

See the Sunbeam Exhibit at the International Heating & Ventilating Exposition, Chicago, Ill., January 27 to 31.

The Fox Furnace Co., Elyria, O.

We want to know about the new Oil Burning Unit and the other Air Conditioners for coal and gas. Send information also on Sunbeam Furnaces; the F. H. A. financing plan; and the name of the Sunbeam jobber nearest to us.

Name

Address

City and State

A-II



F.H.A. — Its Two Chief Problems

AS amended by the last congress, the Federal Government will stop insuring F.H.A. loans under Title 1 on April 1, 1936. Insurance of loans under Title 2 will stop June 31, 1937. Congress can extend insurance of loans under Title 1 if the demand is strong enough.

It is our belief that F.H.A. (both Title 1 and Title 2) have proved to be the soundest business stimulants yet devised by the New Deal. Few contractors and few communities can truthfully say that F.H.A. has not brought about a tremendous upturn in repair, remodeling and new construction. In localities where our industry has not received its due share of the money expended it has been because of a lack of sales effort and not a fault of the act.

Washington reports that up to October 28 under Title 1 some 515,000 loans have been made for above 191,000,000 dollars. In addition owners have spent nearly 1,017,858,000 dollars of their savings for modernization, repair and new construction. Under Title 2 some 51,000 mortgages totaling 200 millions of dollars have been selected for appraisal. This means 72 per cent of the mortgages will result in building.

So far as we can tabulate, our industry has secured about 10 per cent of the dollar business under Title 1. Judging from the condition of most residential heating systems, roofs and sheet metal work, our industry ought to be getting 20 per cent of the money expended.

The act is good and we should, therefore, work for its extension.

This brings up a point (our second problem) which we believe warrants united effort on the part of individual contractors; local, state and national associations, and our manufacturers!

As originally enacted F.H.A. was designed to stimulate repairs, remodeling, renovizing of homes up to an expenditure of \$2,000 on each piece of property. The equipment purchased had to be of such a nature that the apparatus became an integral part of the property. Any piece of apparatus which could be moved out readily did not qualify for a loan.

Note that furniture, refrigerators, stoves (unless built in) did not qualify. Under this ruling, oil burners, stokers, furnaces, controls, (when non-detachable), air conditioning equipment, humidifying equipment (when built in), fans and blowers plus all betterments to the structure proper were approved.

Last session Congress enlarged the list (because business had not increased as Congress thought it should) and permitted refrigerators, cooking stoves, washing machines, ironing machines, cream separators, incubators and a host of similar specialty items to qualify for loans.

As a result the manufacturers of such products and their specialty sales forces have been turning the country inside out in an effort to sell just as many refrigerators, washing machines, incubators, as possible. Gigantic sales programs, country-wide advertising have been used to call attention to the fact that these items

can now be bought on time, with payments guaranteed by the government.

We believe that there is the gravest danger to our industry—yes, the whole construction industry—in this broadening of apparatus qualified for loans. Understand, we are not saying that a mechanical refrigerator is not a betterment but—

Here is the nub of the question.

People have only so much income. If a part of that income is pledged for monthly payments on a refrigerator, that monthly sum cannot be pledged for a new furnace, a new roof or home repairs. Until income increases that owner is no longer a prospect for our services.

The result is that high powered sales appeals applied to apparatus which the owner can do without and which is not nearly so essential as a water-proof roof, adequate heat, paint on the house, is curtailing our possible field of sales.

This act was designed to stimulate the construction business. No other industry needed stimulation quite so much. The construction industry cannot progress—cannot come up out of its tremendous depression until owners HAVE MONEY TO SPEND ON CONSTRUCTION. And owners won't have money to spend with US so long as other high powered industries take away the dollars each family can allot each month.

Frankly, we do not feel that such industries as the refrigerator industry need any stimulation. Their sales curves have mounted year after year despite poor times. Nor do we wish to appear poor losers or cry babies, but if help is being passed around we want all we can get. This construction industry needs every bit of stimulation it can get. It is no fault of ours that people prefer to buy shiny new automobiles rather than a furnace. And there are some 4,000,000 building mechanics out of work.

To quote President Roosevelt's own words—"The building industry represents tremendous purchasing power. Stagnation in the building field has decreased national purchasing power and has narrowed the market for every service and product. . . . To return to work the idle men in the building industry and renew their purchasing power will revive every market. . . . Of every building dollar spent, approximately 75 cents goes to labor on the job and in the production of materials. Next to agriculture the construction industry is the largest employer of men. No industry was harder hit by the depression. New construction during the last two years (spoken in 1934) was a bare 10 per cent of the 1926-1929 volume. . . . About one-tenth of all families on relief are families of building mechanics."

We believe that F.H.A. should be extended beyond next April.

And we believe that the act should again be restricted to cover ONLY those repairs, remodelings, renovizings, which make the property more valuable, more livable.

Let's work to have the act extended and "movables" disqualified!



A Dura exhibit at a recent builders' exhibit. Note the variety of products.

Dura Began As a Sheet Metal Shop - - - Today Its Metal Specialties Are Sold Nationally

By A. B. Laing

THAT a local sheet metal shop can broaden its sphere by the fabrication of sheet metal specialties and reach a distribution of practically national importance is a fact which the progress by DURA STEEL PRODUCTS CO. amply proves. From small beginnings, this Los Angeles firm, which prior to 1930 was known as "Plumbing & Sheet Metal Products Co.", has steadily expanded, increasing fourfold its floor area in the past few years granting new franchises and open-

ing new territory. Under the able management of Wm. Brownstein mechanical facilities have been set up that today are unsurpassed on the Pacific slope.

Dura Steel Products opened at the turn of the century. With four employees, some hand tools and a couple of pedal-operated shears, this concern began business in a downtown store-building no more than 30 feet wide.

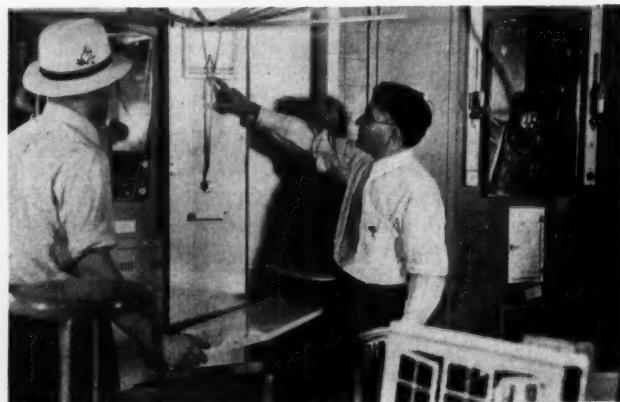
Mostly, they serviced building jobs. But while furnishing contractors with their gutters, furnaces and

spouts the boss—as far back as 1930—was taking every opportunity to suggest to customers the obvious superiority of metallic built-in features and interior trim. The extensive factory occupied now for the extensive business are the tangible results of a definite program laid out at the time of the firm's inception.

As a result, orders for "Dura" trademarked cabinets, cooling towers, chimes and a myriad other household conveniences come in from coast to coast. Last



The busy production manager of DURA personally greets all visitors at his front entrance office. (Note that Wm. Brownstein is an ARTISAN reader and takes his own medicine in the form of a revolving perpetual memo container of sheet metal.)



Wm. Brownstein explains to a customer how the metal ironing board pivots to make room in a small kitchen and the action of the steel arm which forces the drying rack to the ceiling at a twist of the housewife's wrist.



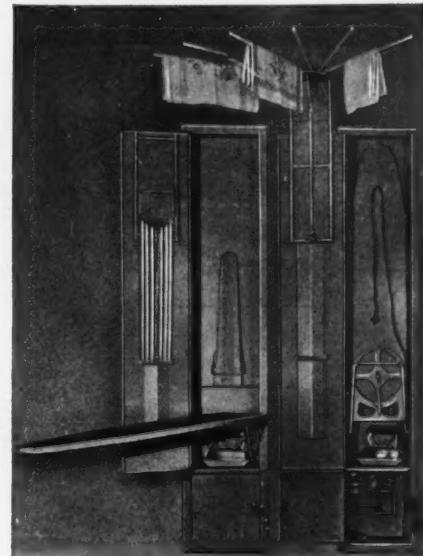
month, for instance, a middle western town air-mailed for enough ironing boards and metal medicine cabinets to outfit an entire subdivision.

As this sizable job of specialties was being routed through the plant, a car was shunted to the loading platform to pick up a solid consignment of sheet metal staples—elbows, gutters, vents, caps, shingles and ridge roll for a building contractor in Texas.

On the day this article was secured at the "In" door of this straight - line - production shop, DURA employes were breaking the seals of a couple of laden cars. From the receiving platform one is struck by the parallel between "sheet metal" and the clothing business as the bales of metal were off-loaded, weighed and hoisted to the storage racks. These rows of soft copper, stainless steel, galvanized and black iron on their labeled 4 in. by 4 in. shelves resembled, in a way, the various bolts of cloth stored in a textile house. As raw material neither has much merchandising value. But when sales and manufacturing organizations for custom-built or ready-to-use items have

Above, Left—Electric hand shears are used to expedite trimming of cabinet tops and thousands of miscellaneous uses about the plant.

Above, Right—In the paint alcove, air-gunners work in pairs. Faster spraying eliminates danger of lap marks.



View of the metal ironing board cabinet opened with board ready for use and folded up.

Below, Left—Hinges and other builder's hardware are neatly welded to metal cabinets. "Gas welds are good," says S. Simon, shop foreman, "but arc welding is faster."

Below, Right—Electrically connected chimes in the display room reveal the simple, yet interesting finish. Heads are cast of aluminum, stainless steel, brass, bronze and various alloys.

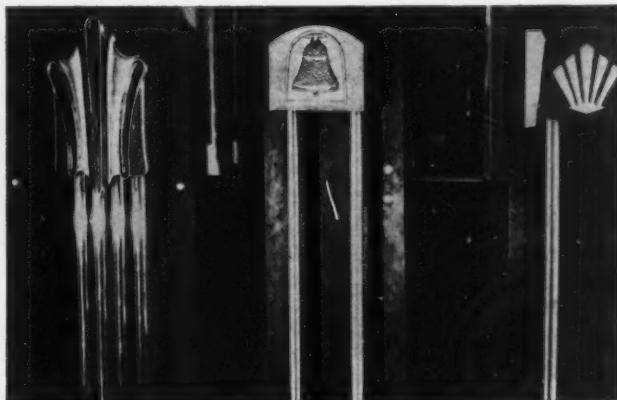


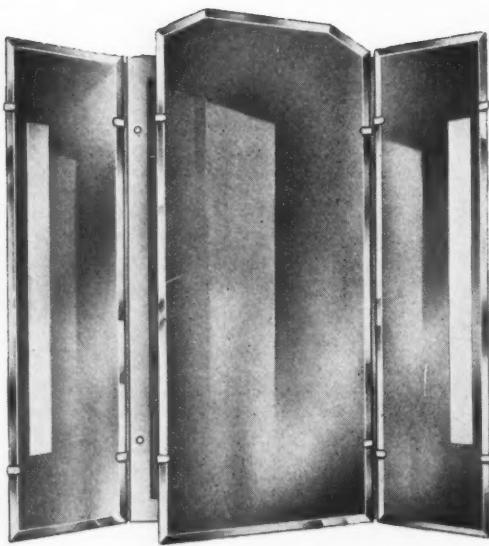
experienced their ability these raw materials became profitable on labor saving products for some contractor who has landed a job to supply some oil company with a few acres of tanks, or a housewife whose mail-box is rusted out.

Both branches of the business issue descriptive folders, in AIA form. The copious illustrations decorating this selling literature are perhaps one of the secrets of how Dura won an "A" from Bradstreet.

Says Salesmanager E. S. Black: "Anything worth making is worth photographing." Particularly in the literature reaching the public. Here liberal art work shows living models demonstrating the ironing boards, coolers and cabinets—the very accessories for which the greatest demand has been built.

Development of the last-named market has, of course, involved a close study of style trends, says Brownstein. "One has to be alert. But I believe that we have kept abreast of changing building tastes and can give the public that 'something different' which it craves; pieces which are always





Left—One of the several types of bathroom mirrors having adjustable lights. Wings are adjustable, glare is eliminated and the metal cabinet shows the highest type of workmanship. These are sold to builders all over the west.

Right—The Dura revolving, ant-proof cooler for food storage consists of a metal cabinet to be built in, a supporting rod and swinging arms with trays. Several finishes are supplied. Oil cups top and bottom keep out ants.

in the mode."

Dura's graceful "Edge Lite" shaving cabinets which the company's draughtsmen evolved is an example of streamlined patterns that are now the vogue. Since the electric lights come ready encased in the chromium slots, the customer is easily convinced that there is a saving on electrical costs, by buying fixtures through the sheet metal firm, that might be applied to purchase a better cabinet. With spot-welded hinges and catches and smoothly arc-welded joints between shelves this cabinet and the metal necktie press and other all-metal furniture are in close harmony with current architectural trend.

Metal Saves Money

"Metal gadgets save drudgery in the home." That is one argument which Brownstein reports as irresistible when contacting prospects. Stepladders, hampers, waste baskets and racks of all kinds which must be carried about the house are so light when stamped in metal that they can be moved by a child. Then these specialties lower the fire hazard and by consequence, the insurance rates—another potent argument.

Referring to company's chimes which are cast to harmonize with any historical period. Mr. Black states that for many years there had been no improvement in home bells and annunciators. While the auto horn passed through many musical phases, the

Space does not permit showing the many equally interesting products in production in the Dura shop. Most of the items are sold to builders and are similar to these. Most items illustrated come in several sizes, types, etc. We will answer questions.

front door bell still gives forth the strident noise of three decades ago. Experimenting with tubes of brass, chrome copper and their alloys, Dura engineers found the most pleasing tonal combinations and opened up a whole new market therewith. Today, hundreds of west coast homes announce the arriving guests in a mellow arpeggio, a dramatic advertisement for the company's product. As with its cabinets, Dura furnishes complete wiring instructions.

By far the biggest seller is the steel ironing board. Above the formed metal sleeve unit is the steel elevator to raise the drying



The milk receptacle above is a metal box to be built into the wall and has a dial telling how much milk is wanted.



racks to the ceiling and below is a complete shoe shining outfit. On the latter fitting a pivoting arm swings out the cast iron rest for the shoe to be shined, while below this is a receptacle of sheet metal for polish and brushes.

Metal Cooler

Advertisements of the company call attention to the fact that much ice can be saved through the use of a metal "cooling tower" in the kitchen. Enamelled trays which swivel outwards at convenient height enable the housewife to get out food without stooping: "More convenient than an ice box." At the top and bottom of the pivoting shaft are oil cups. They foil ants.

A few other items, most popular in the line, are clothes hampers formed in 26 gauge and sprayed to the customer's color choice. Telephone grilles of cast aluminum for replacing or camouflaging the unsightly black box furnished by the 'phone company. Milk receptacles with handy dial. Mail chutes in cast brass or

(Continued on page 72)



A contractor finds telegrams beat all other forms of collection because they gain attention and prod the slow-to-pay's.

By F. E. Kunkel

Telegrams Collect Money Faster!

A HEATING contractor, hard pressed for some ready cash, in sheer desperation sent an urgent appeal by telegraph to ten debtors who owed him too much money and from whose thick hide dunning letters had fallen like water from a duck's back. He got a check in part payment by return mail in four cases, three paid in full, two promised to pay, and one paid no attention to the telegram, which read: "In urgent need of funds—can you help out?"

These quick results gave him an idea, and now he handles all his hard-to-collect and slow-pay accounts via the telegraph. He found that telegraphic communications were not only time savers, but they almost invariably produced the desired results.

For instance, within three months he tried twenty accounts which owed him too much money

for comfort, with a telegram which read: "Must know for personal financial reasons when may expect remittance." The response was as follows:

8 paid up immediately, in whole or in part;

6 paid up in a few days or within the week;

5 wrote in promising to pay on a specific date;

1 ignored the telegram.

"Telegrams work marvels when it comes to collecting overdue accounts," he explains. "My experience has demonstrated that by this method we can raise money quicker on slow pay accounts and seemingly bad-debts, than by any other known method. We can speed our collection turnover from slow-pay customers too.

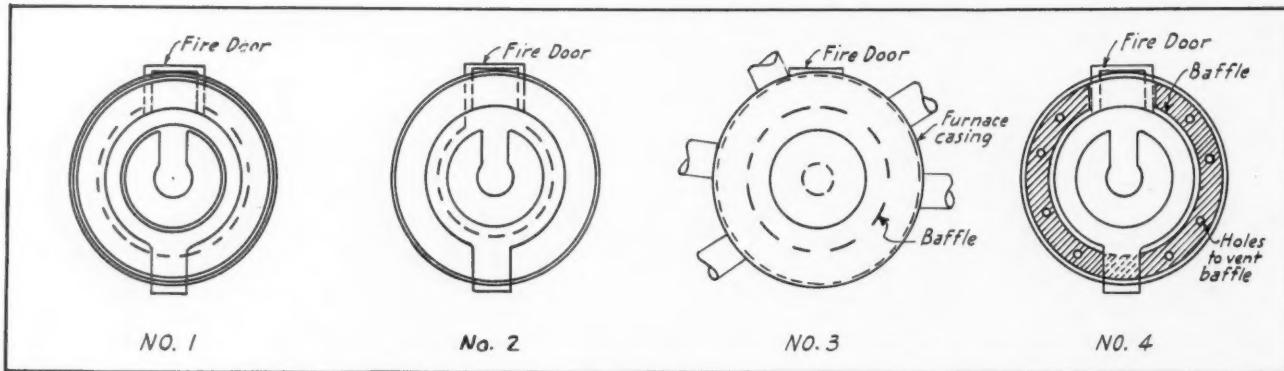
"Because of the natural importance which attaches to any telegram, delinquent debtors pay

more heed to our request for a settlement when they would ignore other communications. They can sidetrack even the most friendly collection letter, but they hesitate a good deal before sidestepping a telegram.

"I send these telegrams collect—with instructions to charge my account with any that are not paid on delivery at destination, or to pay any that come back collect. Yet none has ever been sent me collect and I have only had to pay for three telegrams so far.

"I have worked this scheme for some time now and I seldom have to employ a collection agency or an attorney. I have, of course, had one or two hot shots come back, but I have little difficulty placating them, stating we really needed the money and why, and apologizing for bothering them. I have never lost a single desirable customer."

AMERICAN ARTISAN
DATA SHEETS



Some Suggested Baffling Practices

Whenever a gravity furnace is converted to forced air, we should baffle the casing to insure that the faster moving air will impinge on the hot surfaces. If some air goes by without picking up heat, we have trouble. Here are several baffles for top radiator, cast iron furnace.

In the July and August issues we published suggestions for baffling steel furnaces when converting an existing gravity furnace to blower operation. While the same general recommendations can be applied to cast iron furnaces, contractors have found that due to the design of most cast furnaces, baffles usually are more complicated. Several interesting practices for round casings are pictured and explained in this discussion.

Number 1

T. W. Torr, Engineer, Rudy Furnace Co., Dowagiac, Mich.

"In baffling cast iron furnaces having round casings, the prime requisite is to bring the air passing through the casing in close contact with the heating surfaces of the furnace. In the top radiator type of furnace, we employ the assembly shown in drawings Number 1 and 1A. A vertical baffle sheet is metal screwed to the outside casing as shown. This sheet can either be stopped about the level of the grates and closed off at the bottom

by means of a formed channel as shown in solid lines or can be continued to the floor as shown by the dotted lines.

"Generally this vertical sheet is placed about 1 inch away from the outside edge of the top radiator. Connected to this vertical sheet we recommend a cap sheet fastened around its outside edge to the casing by metal screws and fastened to the upright baffle by metal screws and a turned edge. This cap slopes upward so that the space between the cap and the closest point on the top surface of the radiator is the same as the spacing between radiator and upright sheet.

"The center of the cap is cut out to give a circular opening directly above the center of the radiator. The area of the hole is equal to or just a little larger than the total area of all leader pipes taken off the bonnet. In operation, the air is forced to impinge on the prime heating surfaces and to mix as it passes through the cap hole, resulting in equal pressures and equal temperatures throughout the bonnet."

Number 2

F. H. Geer, Standard Furnace & Supply Co., Omaha, Nebraska

"We have tried numerous types of

baffling for top radiator, round cased cast iron furnaces and at the present are trying out a new plan which we are testing. (Figs. 2 and 2A.) The plan seems to have good possibilities. The baffle consists of a sheet of black iron sloping from the bottom casing ring to a point about 4 inches from the upper fire pot. The sheet combines the offices of a baffle and secondary heating surface.

"If the sheet is carried too high, it

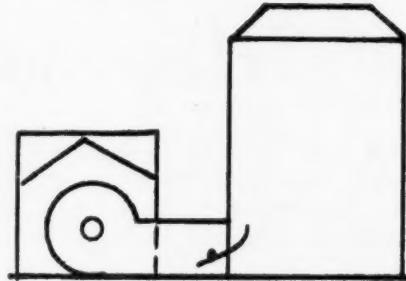
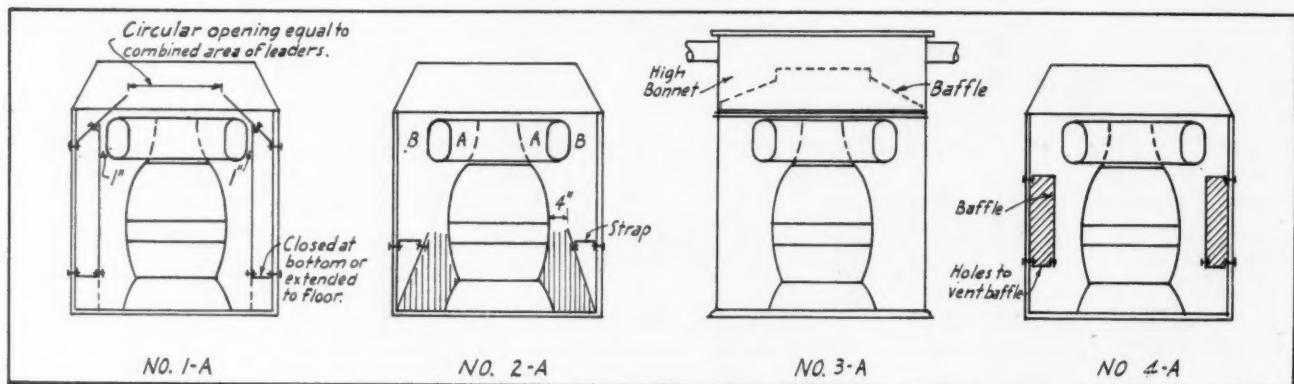
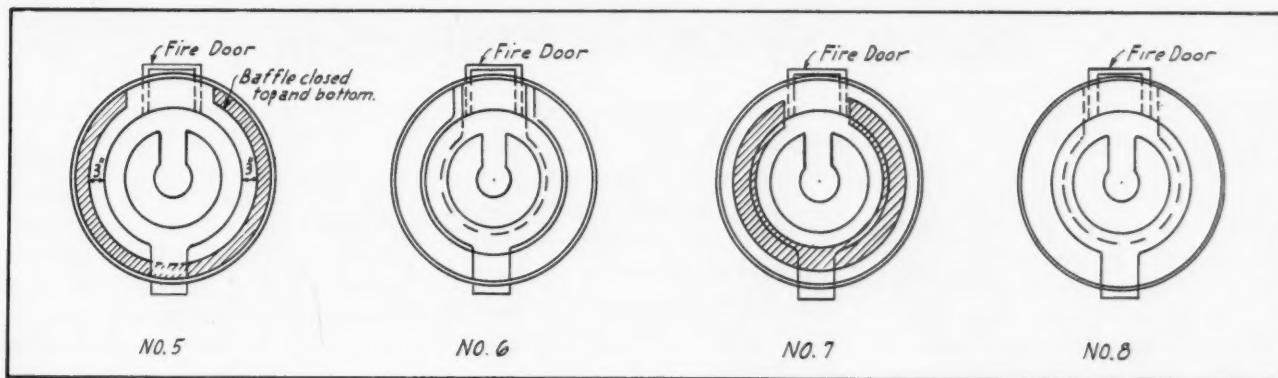


Fig. 1

directs all the air inside the radiator through space "A" and lets no air pass through space "B." So far as we can determine the height must be established for each type and size of fur-





AMERICAN
ARTISAN
DATA
SHEETS

nace. The sheet is fastened to the casing ring at the bottom and either is self supporting or held in position by straps as shown.

"Also interesting to us, when we revamp a gravity job to mechanical circulation we have found that the installation of a curved damper as shown in the blower shoe helps direct the air from the fan into the rear part of the casing, a part of the area oftentimes difficult to keep filled with air. This damper is attached and held in position by a locking type of quadrant so that the damper can be adjusted for each installation."

Number 3

Several Dealers

Figs. 3 and 3A show suggestions submitted by several contractors. The purpose of the scheme is to force all the air through a restricted opening at the top of the furnace and after passing through the opening disperse the air throughout the high bonnet, giving equal pressures and temperatures. The baffle is cut from one or several sheets (if several sheets all pieces are riveted and soldered together) and is fastened around the turned down edge to the casing. The turned collar gives the necessary stiffness to the top. The idea is not recommended where the bonnet is low.

Number 4

A. H. Kundee, Engineer, Premier Warm Air Heater Co., Dowagiac, Mich.

"While there are many ways of baffling a round-cased, cast iron furnace when converting gravity to forced air, if the installer will keep in mind the fact that the purpose is to heat all the air which passes through the casing he will automatically reject many of

the 'trick' schemes which have little to recommend them other than their novelty.

"Our aim is to make the baffle as simple and easy to install as possible, therefore we use a box section which fastens to the casing as shown in Figs. 4 and 4A. On Premier furnaces the regular radiation shield forms the inside of the baffle, while the liner sheet forms the outside sheet. The box baffle is located at or just above the grate level and extends upward to a point where the space between the top of the baffle box and the bottom of the radiator is just about equal to the space between the radiator and combustion chamber. We recommend that the box be ventilated by means of several holes as shown in Fig. 4. These holes run through the top only."

Number 5

Fox Furnace Co., Elyria, Ohio

"We recommend baffles of boxed section as shown in Figs. 5 and 5A, made either of black iron or galvanized iron. Where such a baffle is employed we do not find any need for additional reflecting sheets. Also we do not recommend holes in the baffle box for circulation.

"The baffle can be made in one piece or three pieces fastened together with metal screws. The inside surface of the baffle is located 3 inches from the outside edge of the top radiator as shown, and continues from one edge of the door frame to the other (completely around the interior). The lower edge is placed at about the top of the ash pit section and the baffle continues upward to the top of the upper casing sheet."

Number 6

J. A. Doherty, Engineer, Richardson & Boynton Co., New York

"We have done considerable experimental work on baffling cast iron gravity furnaces for conversion to forced air. We have found the best results with the baffle shown in Figs. 6 and 6A.

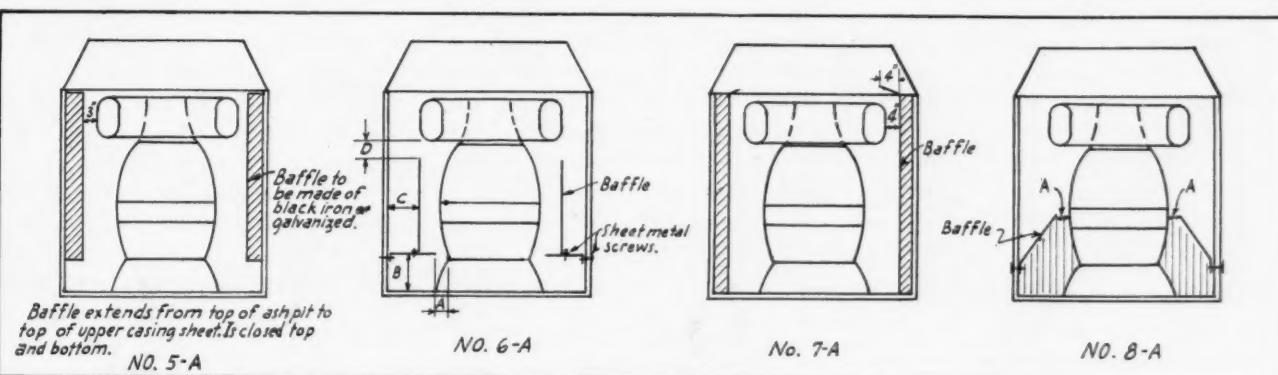
"The baffle is made in two pieces. The lower section consists of a circular plate turned down around the outside edge for fastening to the casing with metal screws. The upright section circles the castings from front panel edge to the other edge and is turned in as shown in Fig. 6A to screw to the flat plate below.

"The flat plate varies slightly in its distance from the floor as shown in the tabulation, but is at about the level of the grates. The distances 'A' and 'D' and 'C' also vary with furnace size. See the tabulation."

Measurements

	A	B	C	D
136-T-2	2	16"	3 3/4"	3"
140-T-2	2 1/2	16"	5 5/8"	3"
144-T-2	3	16"	5 3/4"	3"
148-T-2	4	16"	5 1/8"	3"
152-T-2	5	16"	4"	3"
156-T-2	6	16"	4 1/8"	3"
160-T-2	7	16"	3 15/16"	3"
"Perfect" No.				
3322	2	14"	2 3/4"	3"
3362	2	14"	4"	3"
3402	2 1/2	14"	6"	3"
3442	3	14"	6"	3"
3482	4	14"	5 1/4"	3"
3522	5	14"	4 1/4"	3"
2229-U	7	16 1/4"	4 1/2"	3"

(Continued on page 70)



Better Weather Protection

THE proper application and installation of valley flashing is a feature of weather protection which the contractor should not slight. Because valleys usually slope sharply, poor construction is often minimized by the rapidity of water flow. Despite this fact, however, a proper valley is a sure safeguard against future trouble and is no more difficult to install than an improper valley.

Valleys fall within two general types—the "open" valley and the "closed" valley. Closed valleys usually are restricted to locations where the valley slope is 45 degrees or more. Open valleys vary considerably in design, such leeway being permissible because the valley forms a separate metal construction.

On the facing page we show a number of recommended designs for open and closed valleys for residences. In some of the drawings variations from the basic design are also shown.

Open Valley

Fig. 1 shows a common type of open valley where both roof slopes are about equal. The valley can be made of copper, lead, galvanized iron (painted) or other metals. It is recommended that whatever the material used the valley sheets be cut as long as possible to reduce the number of cross seams. Where only one cross seam is used this seam can be locked and soldered.

Where conditions make necessary the use of many smaller sheets with numerous cross seams, it is suggested that instead of locking and soldering the sheets be lapped generously and left unlocked. This practice provides plenty of space for expansion and contraction. Where lapping is used at least two inches of head lap should be provided.

The sides of the valley sheet should be turned onto the sheet as shown to provide $\frac{1}{2}$ -inch locks for cleating. Cleats on 12-inch centers makes a good installation, the cleats being about two inches wide and nailed with at least two

A series of illustrated reference sheets selected from recommended practices in use in the industry. The facing page shows details of the methods for flashing valleys on roofs of several kinds of materials. Emphasis is given the minor details often overlooked.

nails. Use nails which will not rust. The cleat ends should be folded back over the nails.

Figs. 1A, 1B, 1C show variations in the valley sheet. In Fig. 1A the "fold over" provides a means for raising the butt of the shingles off the metal thereby reducing chance of line corrosion. In some localities this line corrosion where shingles, metal and air come together is a serious problem and the fold over is the practical solution.

Fig. 1B shows a type of construction recommended where the slopes are unequal in amount of drainage. The "V" crimp along the bottom keeps the larger quantity of water from forcing the smaller drainage side to back up over the top of the flashing. Fig. 1C shows another method for the same purpose—in this case a fabricated angle or Tee is soldered along the side having smallest amount of drainage.

One Flat Slope

There is always a difficult problem where one of the roof slopes is so nearly flat that water from the steeper slope may flow clear across the valley. To prevent this the flat side is flashed as shown in Fig. 2. Flashing pieces are inserted between each pair of shingles next to the valley on the flat slope. Each flashing should lap the piece below about three inches. The detail shows the form of the small pieces. Note that each small flashing is soldered to the main valley sheet.

Fig. 2A shows recommended construction where both roof slopes are very steep making the valley almost a boxed gutter. Usually such valleys will be formed in two or three pieces, in

which case the seam running down the valley should be flat seamed and soldered. It is essential in this location to keep the shingle butts off the metal. The fold over shown in Fig. 1A is not as good as a continuous cant strip soldered to the valley sheet as shown. This cant strip should be placed 1 or 2 inches back from the butt edge. Small breaks in the cant strip (about $\frac{1}{4}$ inch wide) as shown are suggested to take care of longitudinal expansion and provide seepage. The valley sheets should be carried up behind the second row of shingles or tile.

Closed Valley

Fig. 3 shows construction for a closed valley. Good practice recommends that a closed valley be used only where the valley slope is 45 degrees or more, since flow of water is not so rapid as in the open valley. Instead of a continuous valley sheet small pieces as shown in the detail are most practical. In this case the pieces are nailed along the top edge.

Each sheet should be cut wide enough to give a vertical lap of from 4 to 7 inches as shown in detail B-B. The flashing sheets should lap the shingles below at least 3 inches and should be carried down just below the butts of the course above. To secure nailing space each sheet should be long enough to exceed the shingle length by 2 inches.

These flashing sheets should always be cut from a template made on the job to be sure that the length, width, pitch are correct.

Fig. 4 shows another method of flashing closed valleys, differing from the method shown in Fig. 3 in that the flashing pieces are not nailed but are cut with lugs which are folded over so that the flashing hooks over the upper edge of each course of slate or shingles. With this type of construction it is suggested that the flashing extend at least 7 inches either side of the center line of the valley.

• VALLEYS •

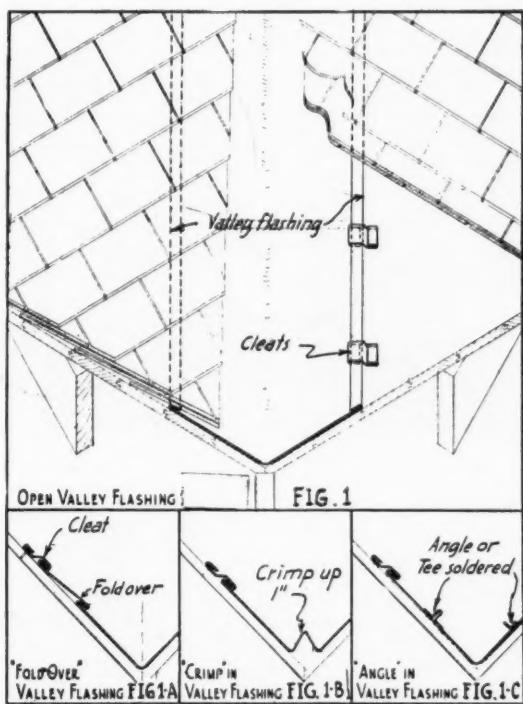


FIG. 1

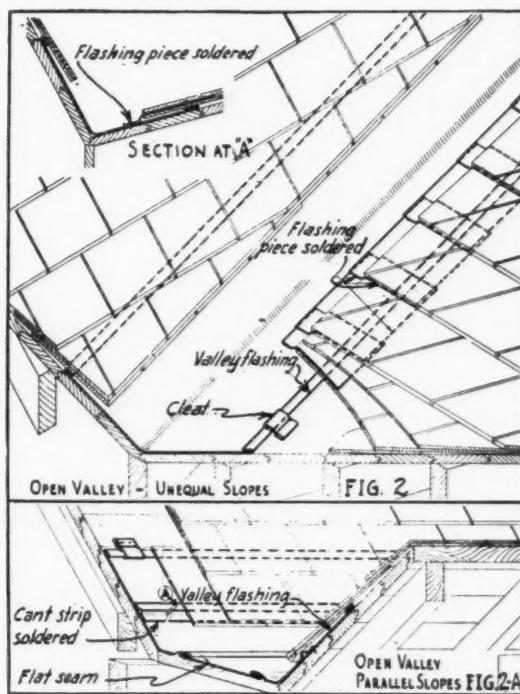


FIG. 2

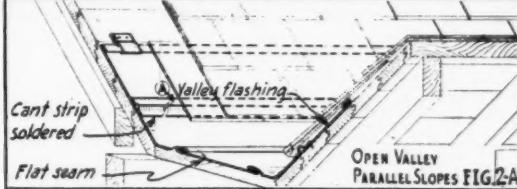
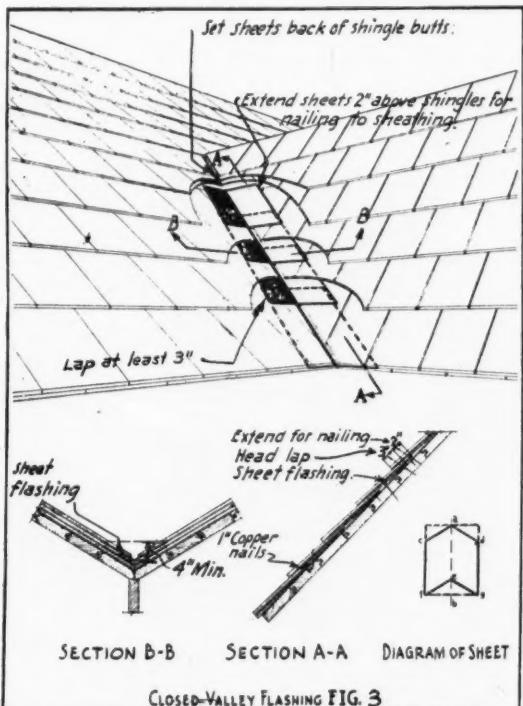


FIG. 2A

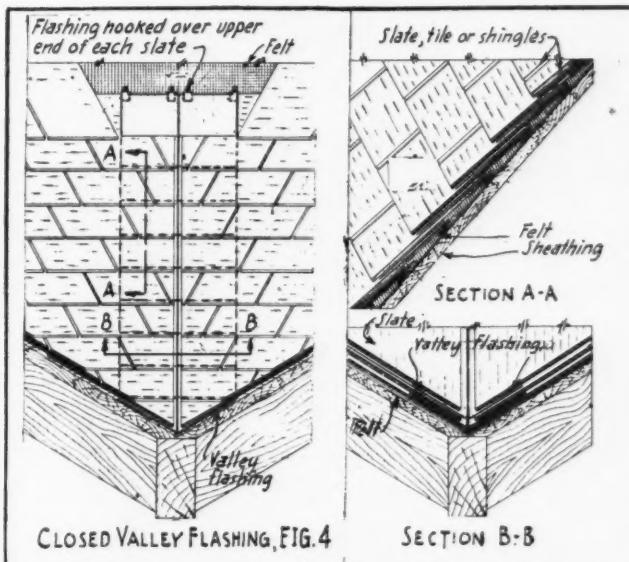
The drawing above shows recommended practice where an open valley is used between adjoining roofs having equal slopes. If possible, long sheets should be used, but where small sheets are laid, generous laps rather than soldered seams are suggested.

Where one slope is nearly flat water will flow across the valley and penetrate the roof unless some form of shingle flashing is used. These flashings can be made in small sizes and should underlie the shingles as shown above. The flashing should be soldered to the main valley sheet. Cant strips should be used where both slopes are nearly flat.



CLOSED-VALLEY FLASHING FIG. 3

Closed valleys may cause trouble where slopes are less than 45 degrees. Small pieces are easiest to lay and the lap should be about as generous as shown in the diagram.

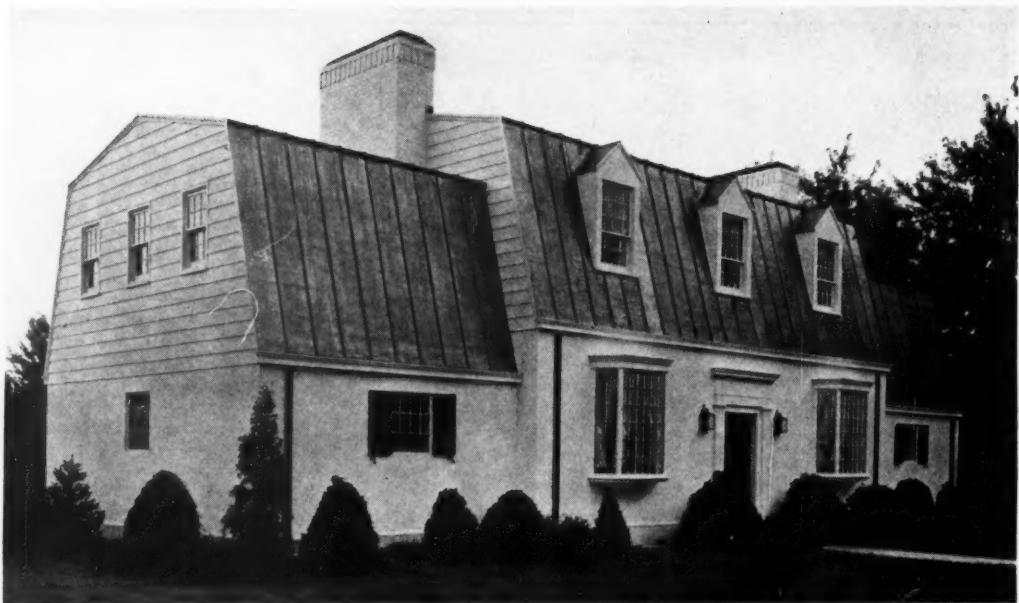


CLOSED VALLEY FLASHING FIG. 4

SECTION B-B

In closed valleys, nailing can be dispensed with if the valley is made of small pieces so formed that the upper edge of each piece hooks over the upper edge of each shingle. Horizontal laps should be generous so that most of the valley is protected by two pieces of flashing as shown.

This month's cover illustration shows mechanics closing standing seams on the roof; seaming roof of bay; applying artificial patina to copper.



An All-Copper House

By R. F. Strohacker

An all copper house, incorporating new ideas in application of metal has been opened for inspection in Bethesda, a Washington suburb. While the design and fabrication features are patented, the house is intended for erection by the sheet metal industry. It is not a pre-fabricated house, excepting for

the wall plates and steel frame. The house was erected by Copper Houses, Inc., a subsidiary of Kennecott Copper Corporation.

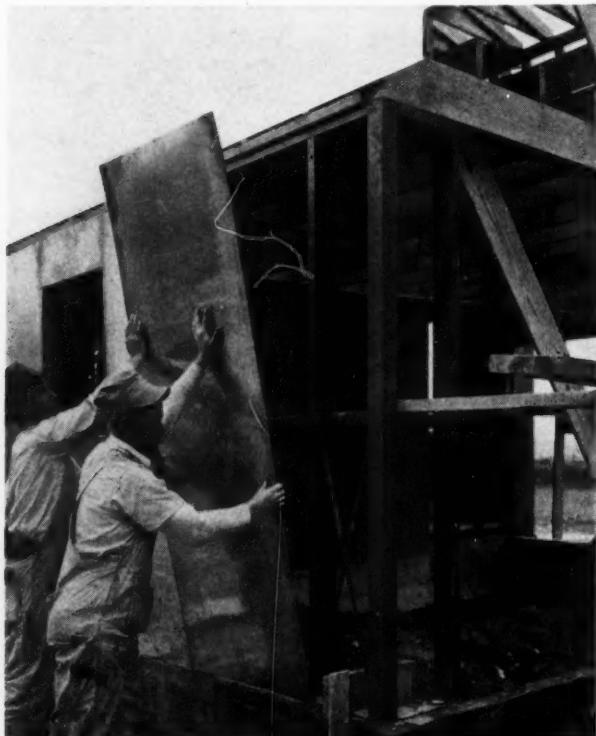
Heretofore copper houses have been designed in extremely modern style. This plan is intended to stimulate the building of copper houses in the more accepted styles, and which will combine the

savings of pre-fabricated with the appearance of conventional architectural practice.

This house is of the English farm house type. Copper Houses, Inc., has prepared plans for a number of houses in Colonial and other styles of architecture, which they feel will harmonize better than modern houses with the finer



The copper wall sections were plumbed into the wall and grouted along the top of the foundation. These sections were all sized for their particular location.



Along the "Ls," full wall height sections were used. The exterior copper is backed up with a thickness of composition board of rigidity.

type of American residential districts. Although many savings of the pre-fabricated idea are embodied in the construction of the house, none of the architectural beauty available with regular methods of construction has been sacrificed.

The construction principles used in the house can be applied to almost any type of design, and can be built by orthodox building methods and regular building tradesmen. The cost of these copper houses depends on the size and design.

Comparing copper houses with the same designs in brick, or wood, the comparison would be distinctly favorable to copper. The present designs which have been planned range upward from approximately \$4,500. The model house now being shown represents one of the larger houses.

The entire outside of the house is made of copper. The outside walls, the roof, and roofing accessories, are all copper. In addition the plumbing lines, heating lines, radiation, hardware on the inside of the house are also copper, or copper alloys. The result is a house well protected against deterioration.



The framework of the house is structural steel composed of 4-inch channel uprights bolted to a steel sill and reinforced by horizontal and criss-cross members.

The framework of the house is of structural steel. The floor joists between the basement and first floor, and between the first and second floors are also of steel, and the bearing of the house is entirely on the outside steel framework. Therefore, since the partitions between the rooms carry no load, the arrangement of the rooms can easily be changed after the house is completed, just as in modern office buildings.

The outside walls consist of heavy copper plates backed by a half inch thickness of composition

board, which lends additional stability to the sheets, and minimizes any metallic noise when the plates are struck. The plates are fastened to the structural steel and uprights by means of a special bronze holding strip upon which patents have been applied for. This special method of attachment not only holds the sheets of copper tightly together, but also provides for both horizontal and vertical expansion, and at the same time gives an absolutely weather-proof and insect-proof connection.

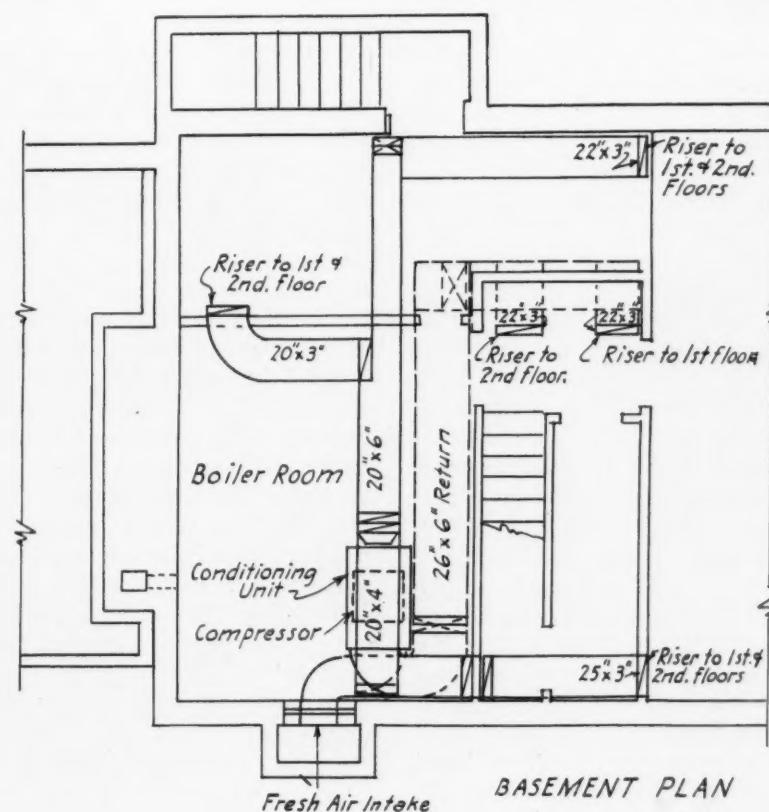
The roof is covered with regular sixteen-ounce sheet copper over a wood deck, and heat and cold insulation is provided for by a four-inch thickness of spun glass inside the walls and roof.

The inside walls of the house are plaster on metal lath with the space between the walls filled with spun glass insulation. While the total thickness of the wall is only about six inches, the insulation provides a wall equivalent to approximately eight feet of solid masonry in keeping out heat or cold.

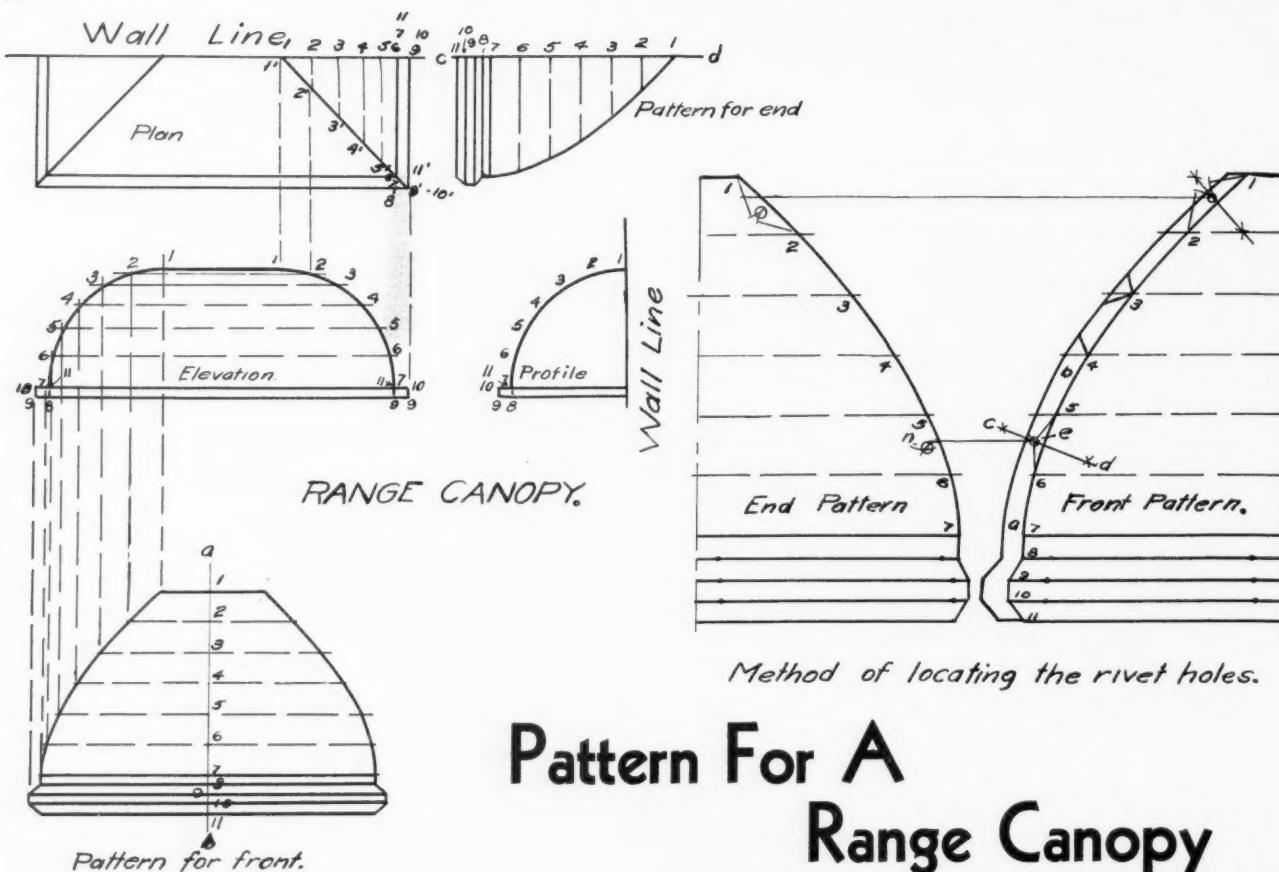
Hard wood floors are laid on the fire-proof sub-floor, which is supported by the steel floor joist.

All the plumbing pipes in the house are of non-rustable copper tubing, and the plumbing fixtures are chromium plated brass to resist tarnish. The house is also provided with a complete air conditioning system, which will provide warm moist air in the winter-time, and dry cool air during the hot summer months, and with the

(Continued on page 70)



Layout of the basement showing the year 'round air conditioning system with its ducts, compressors and heater.



THE range canopy pattern problem was submitted by a Texas reader of the American Artisan. The canopies are made of various sizes and shapes, but regardless of the shape of the profile the method of procedure is the same.

Begin by drawing the plan, elevation and profile, in their proper position, as shown. Divide the arc representing the curved surface of the profile into equal spaces. In the full sized pattern there will, of course, be many more divisions than on this profile. Now draw the elevation view as shown and from numbers 1, 2, 3, 4, etc. on the profile view project horizontal lines across, intersecting the arcs on the ends of the canopy thus locating 1, 2, 3, 4, etc. on the elevation view.

Now draw vertical lines from points 1, 2, 3, 4 on the right hand end of the elevation view, allowing them to intersect both the miter line and the wall line, as shown by the vertical lines 1, 2, 3, 4, etc. on the elevation view. It is important that care be exercised in drawing all projection lines, this being especially true when locating points on the miter lines on the plan view.

By L. F. Hyatt
Contributing Editor

We are now ready to develop the pattern for the front of the canopy. First draw the vertical stretchout line a, b , an indefinite length and upon this line step off the distances 1, 2, 3, 4, etc. found upon the profile view. Through each of these points draw horizontal lines of indefinite length. Next from points 1, 2, 3, 4, etc. on each end of the elevation view drop vertical lines, allowing them to intersect the lines of like numbers on the pattern, and through these points of intersection draw the curved and straight lines representing the pattern for the front of the canopy.

Now draw the stretchout line c, d , for the end pattern and upon this line step off the distances 1, 2, 3, 4, found on the curved end of the elevation, or, since the curve of the ends and front are the same, these distances may be taken from the profile view. From each of these points on c, d , drop lines of an indefinite length.

Next from 1', 2', 3', 4', etc. found on the miter line on the plan view, draw horizontal lines intersecting like numbered lines which were

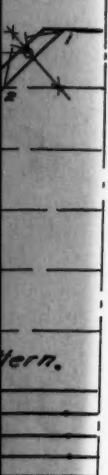
dropped from the points on the stretchout line c, d . Now draw the curved line and straight line, thus completing the pattern.

To illustrate the method of locating the rivet holes in the front and ends we have drawn an enlarged pattern of the front and end. This is done because contractors experience difficulty in getting the holes to coincide when the laps are bent around to rivet.

To begin, first draw the line a, b , carefully through points 5 and 6 and erect the line c, d perpendicular to this line. Then locate the point for the rivet hole half way between the line representing the pattern line and the line representing the lap. Next take the distance 5 to e and with this distance as a radius and 5 on the end pattern as a center strike an arc of indefinite length. Next take the distance 6 to e found on the front and with point 6 on the end pattern as a center strike an arc intersecting the arc previously drawn locating the corresponding rivet hole n .

A horizontal line drawn from e on the pattern for the front will show that the center of the holes is not in line. The centers for the rivet holes between 1 and 2 are also lo-

(Continued on page 76)



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Air Conditioning Section

**Devoted to the technical and merchandising problems
of air conditioning in homes and small buildings**

THE past summer witnessed the installation of more cooling systems than most of us realize. Practically every city or town—from the largest to the smallest—had from two to several dozen commercial cooling installations completed.

— A sad feature of last summer's operations is the fact that in too many instances the sheet metal contractor acted only as a sub-contractor and did not get the profit from the apparatus. — Now we are entering the winter heating season. Winter air conditioning is vastly more important to general health than summer cooling. Further, the persons buying winter conditioning are our millions of home owners. Cooling will not appeal to them as strongly as will winter conditioning if we tell our story. And winter conditioning is our rightful business. Let's not lose this gigantic market for apparatus and services!

.. on to Chicago

.. on to Prosperity



EVERY other year brings this opportunity to advance the welfare of all whose interests are affected by the latest developments in the design, production, sale, installation, use and maintenance of materials, equipment, instruments, tools and supplies for heating, cooling, humidification, dehumidification, cleaning and moving of indoor air for domestic, business, industrial or public use to promote health, comfort and efficiency.

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New International Amphitheatre, Chicago, world capital for heating, ventilating and air conditioning men during the



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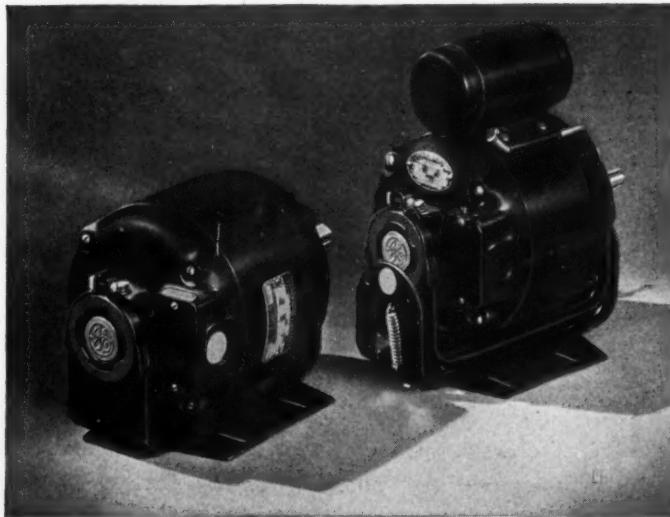
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OTHER AIDS TO SALES

G-E ALL-RUBBER
PLUGS AND CORDS

General Electric all-rubber plugs are designed and built to provide staying power under trying conditions. Designed to take the most severe punishment, they are superior to ordinary plugs in many respects.

For example, their all-rubber construction prevents common breakage. G-E all-rubber plugs can be dropped or stepped on without damage to them—treatment that might ruin ordinary plugs.

These plugs have an important and exclusive feature—they are molded on the cord. This means permanent construction and lasting service. Cord and plug do not become disconnected. They have built-in strength—the result is dependability. Ask for further information.

MOTOR-STARTING
SWITCH

General Electric's small motor-starting switch meets the demand for positive overload protection for fractional-horsepower motors.

Housed in a strong, steel case with an attractive aluminum face plate, it is easily installed—convenient conduit knock-outs are located in both top and bottom. It is equipped with unusually large, pure-silver contacts—an assurance of long life and trouble-free service. It has snap action which prevents slow opening or closing, and also prevents burning of contacts. Write for complete details.

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WITH
G-E MOTORS

WHEN you present your next installation proposition, tell the prospect that you would like to use G-E electric equipment—motors, control, cable, etc. You won't have to sell him on their desirability. He's already convinced that G-E products are *high-quality* products. *The reputation of G-E equipment will help you sell.*

For example, General Electric offers you . . .

CARE-FREE-MOTORS . . . EASY TO INSTALL
. . . SIMPLE TO MAINTAIN . . . DEPENDABLE

Type KH resistance, split-phase motors for belt-driven fans and blowers requiring up to $\frac{1}{4}$ hp; Type KC motors for the same class of service where the horsepower required is from $\frac{1}{3}$ hp up (in the fractional-hp range). Both types have the following advantages:

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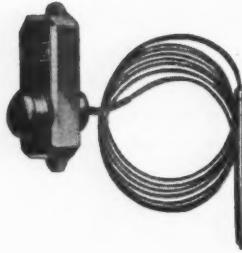
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This is now practicable in the No. 291 "Genuine Detroit" Nozzle for air conditioning and humidification equipment. The No. 291 is a self-cleaning nozzle which reams out the orifice each time the control operates to interrupt the water supply. This effectively clears the nozzle of all grease, dirt or scale which may be present. It keeps the nozzle working properly and assures the desired results from the air conditioning equipment on which it is used.



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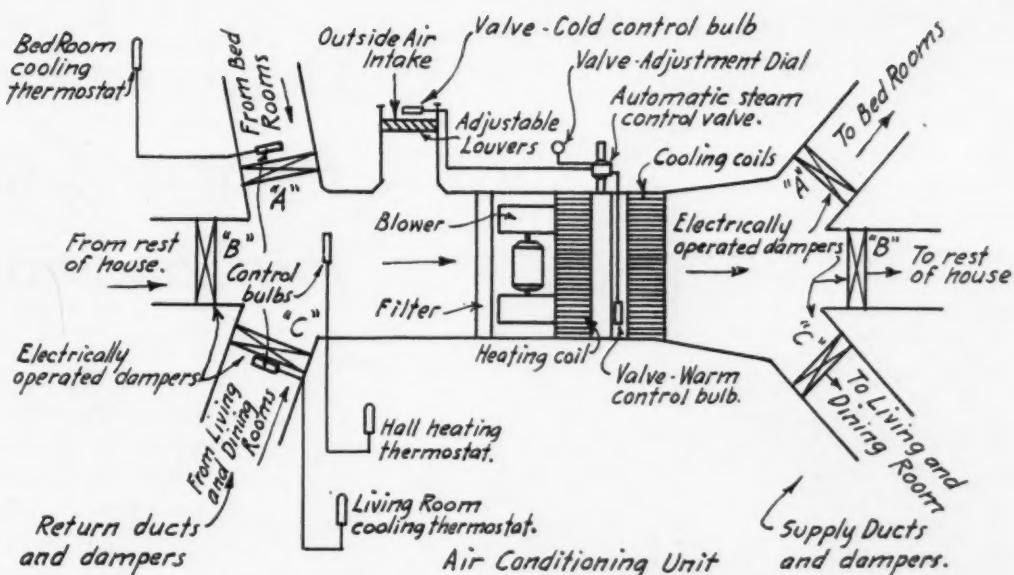
Following are some of the many items of winter air conditioning equipment we carry:

Furnaces—Blowers and Fans—Air Filters—Air Conditioner Boosters—Controls and Accessories—Registers, Grilles and Faces—Damper Regulators—Air Washers—Furnace Pipe and Fittings—Automatic Humidifiers.

All orders given prompt attention from one of our three conveniently located warehouses.

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This plan shows the arrangement of vital equipment in the "control room." Special attention is called to the zone dampers; the heating and cooling coils; the fan and filters; and the remote thermostat bulbs which reflect return air duct temperatures rather than room temperatures. Note that the returns also have electric dampers.



A Zone Control System With The Thermostat Bulbs In The Return Ducts

By J. F. Lamb

THE conventional method of automatic temperature control for residences usually consists of a self-contained thermostat mounted on the wall of the hall or living room, and connected to start and stop an oil burner or stoker, or to operate a damper motor or the air circulating fan if the heat supply is maintained between selected temperatures.

Subject to the limitations due to "overshooting," all that any thermostat can do is to maintain a constant average temperature at the location of its temperature control bulb. Tests and theory indicate that a thermostat mounted in the usual location at the eye level, about 5 feet above the floor does not give as good control results as when mounted at a lower level, say, 30 inches above the floor. This is because the actual occupied portion of the room is below the 5-foot level, especially for persons seated or for children. A thermostat control bulb at the 5-foot level is, therefore, not regulating the air temperature to a constant average value in the center of the occupied zone.

Locating the temperature control bulb in the hall or living room wall assumes that the location selected will be representative of the average temperature throughout the house. This, of course, is not necessarily true, especially if the temperature control bulb is exposed to cold drafts, or other local factors tending to make the temperature at the location selected, non-representative. With a forced circulating warm air heating system, a thermostat on the hall or living room wall is more likely to truly control the average temperature of the house than if a steam or hot water radiator system is used.

In many heating and cooling installations air is continuously recirculated, and the temperature of

this recirculated air is well representative of the average air temperature in the space being heated or cooled. The recirculated air stream therefore offers a good location for the thermostat temperature control bulb. In air conditioned railway cars, the usual practice is to locate the thermostats in the recirculated air stream. Temperature control bulbs for steam heated, floor mounted, unit heaters are likewise often located in the return air stream.

The same idea can be applied to the automatic temperature control of a residence, having a forced air circulating system with continuous air circulation. The air circulation should be continuous, and the thermostat should, therefore, not function to stop air circulation. Otherwise, the temperature at the thermostatic control bulb would not necessarily be representative of the average house air temperature, when the fan is shut down.

This thermostat arrangement is used in the air conditioning system of the "Home of Tomorrow" recently constructed at Mansfield, Ohio. Each thermostat used for temperature control is of the bellows type, but with a separately mounted remote control bulb connected to the bellows with small diameter copper tubing. The remote control bulbs are located in the return air ducts and the thermostats are located conveniently in the upstairs rooms. This arrangement combines the accessibility and adjustment of the conventional thermostat location with the "true average" temperature control possible using continuous air circulation. The special thermostats used for this application cost only a few dollars more than conventional thermostats.

The operating results to date with this system have proved very satisfactory, the entire house
(Continued on page 52)



Above—Exterior of the Inn as seen from the road showing the zones effected by sunlight and occupancy.



Above—A typical bedroom showing air supply outlet just below the molding and almost indistinguishable.

Below—View of the main lobby showing air outlets in chandeliers.



Carrier Photographs.

THE DEARBORN INN, Dearborn, Mich., is another example of a 100 per cent air conditioned hotel. The Inn is twenty minutes from Detroit's business center, and attracts numerous commercial visitors who wish to make their headquarters close to the principal plant of the Ford Motor Company. The Dearborn Inn is one of the Ford-controlled Oakwood Hotel Company, operated by the L. G. Treadway Service Corporation, as one of the seventeen "Real New England Inns."

The Carrier Engineering Corporation designers of the installation worked out some ingenious ideas at Dearborn. For example, there are twelve "zone units," in any of which the various functions of air

Dearborn Inn Another Completely Air Conditioned Hotel

The Dearborn Inn, Ford Operated, and 100 per cent air conditioned, provides 12 month comfort for guests by a system in which several interesting innovations were included. Particular attention is called to the zone operation.

conditioning can be controlled and adjusted separately to allow for different degrees of occupancy and also to compensate for the varying intensity of the sun as it concentrates its rays on different surfaces of the Inn during its progress from East to West. However, as far as occupancy is concerned, the air conditioning has been followed by such an increase in business that the Inn has been booked to between 90 and 100 per cent capacity all summer and no zone has been shut off or tapered down because of vacancies. There are one hundred guest rooms.

Looking out of your window in one of these rooms (and you are asked to keep the windows always closed, even at night, to keep the "cooling" from being dissipated into the outside air) you may discover a pool enclosed in shrubbery, among the gardens, and sprays of water playing like fountains in the center of the pool. Actually, the water from the condenser in the cooling system is piped to the pool, where it dissipates its heat in the open air and is then returned to the machine for continuous use. This makes a substantial saving in the yearly water bill.

Air Supply Outlets

In the lobby artistic chandeliers, suspended from terraced plaques, are the outlets. The architects and engineers, being momentarily nonplussed as to where to cut in the outlets in such a large room with no pillars or other devices for centralizing the outlets in various areas, hit upon the idea of dropping or terracing the plaques and letting the outlets do their stuff between the terraces.

In the guest rooms and some of the public rooms the outlets are inconspicuously placed close to the ceiling, colored to resemble the wall paper, and in the sleeping quarters are so arranged that the degree of cooling can be adjusted to suit the personal preference of the guest. In the coffee shop the outlets are ingeniously furred in the ceiling beams. The exhaust air from the coffee shop and the dining room goes directly out of doors, in order to avoid permitting food odors to permeate other rooms. Be-

cause of air conditioning the average restaurant check and the "gross takings" have been substantially increased. Room prices have also been advanced, and with no kicks. The operators believe that the investment will recoup its cost and pay dividends, in terms of increased business, in a surprisingly short time. It is an axiom in the hotel industry that all rooms sold over and above a known "pay load" are so much velvet, being all profit. Similarly, in the restaurants, the greater average size of the check brings in profits that rise in the form of an inverted pyramid after the initial overhead has been earned.

The air conditioning system is comprised of an air washer which sends clean, cooled, and dehumidified air in the summer, and clean and humidified air in the winter, to the 12 zone units.

Zone Layout

These zone units mix the air from the central system with recirculated air from the rooms (in the summer) and supply it to the guest rooms, lobby, coffee shop, dining room, barber shop, etc., according to which sections of the hotel they handle. In the winter there is no mixing, a constant flow of humidified air with a proper amount of fresh air introduced being supplied to all rooms constantly.

The zone units then, are nothing more than blower units with a damper arrangement to provide a proper mixture of the cooled and the recirculated air.

Control of temperatures is accomplished by means of air-pressure operated dampers in the various zone units. Actuated by thermostats, the damper at the point where the main supply duct meets the zone unit opens when cooling is called for, and closes while at the same time opening the damper on the recirculated air return zone ducts when the desired temperatures have been reached.

Zoning of the building for purposes of air conditioning was very carefully worked out, with particular attention being paid to a layout whereby all sections of a particular zone would have, at one time, the same estimated heat gain from such sources as the sun, etc.

In guest room zones, the thermostatic control bulb is placed on the wall in one room only, the room selected being the most typical of the average atmospheric conditions found in the entire zone. In the dining room and other public rooms, the control bulb is placed in the recirculated air duct.

Static Pressure Regulated

A great enough static pressure is maintained in the two main supply ducts carrying the cooled, dehumidified and ventilating air to supply as many zones at one time as is necessary.

As the blower, taking air from the washer and supplying it through the main supply ducts, runs all the time at a constant speed, there are static pressure-regulating dampers in these ducts to prevent too great a pressure being built up.

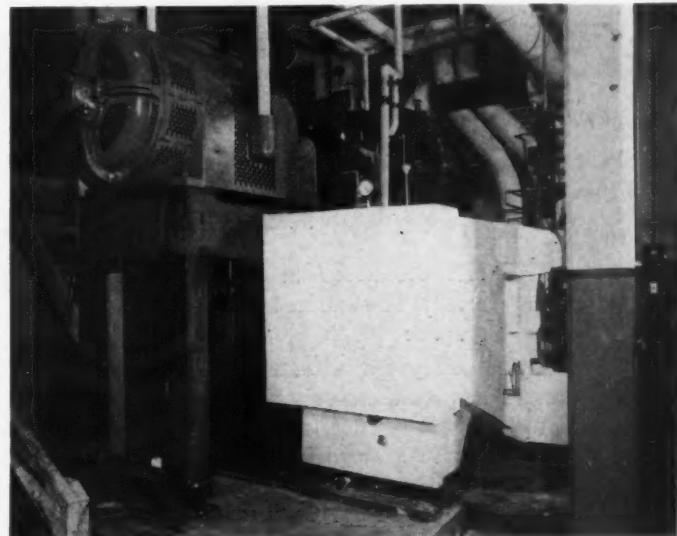
All the zone controls operate through Taylor re-

cording thermostats on a central panel board located adjacent to the central conditioning apparatus in the basement. With these recording instruments the hotel engineering staff can check instantly a temperature rise or drop in any part of the hotel.

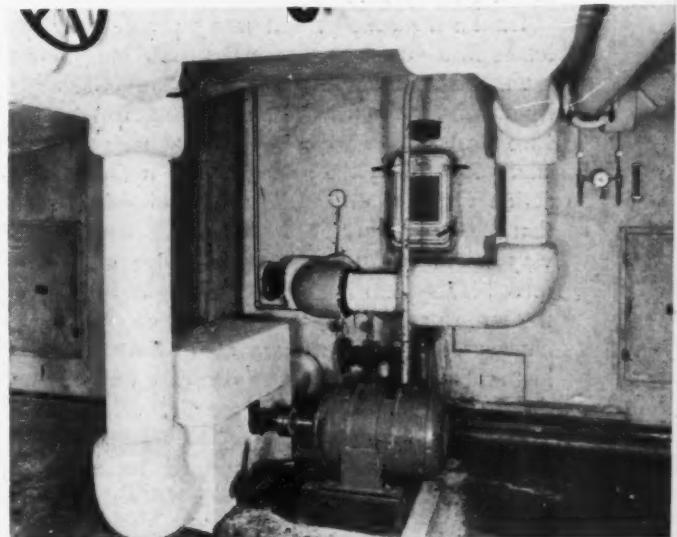
Exhausted Into Corridor

Air in the guest rooms goes out through the transom or leaks out the door to the corridor. There are grilles to two kinds of return

(Continued on page 42)



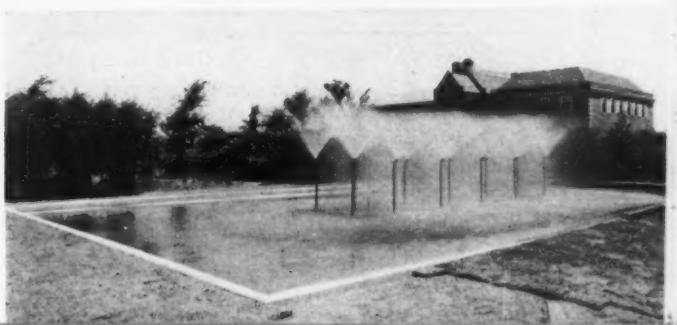
Above—The 250-ton Carrier compressor in the boiler room. The compressor cools the water for the air washers.



Above—The dehumidifier with pump adjoining the outside air intake. The dehumidifier is the large chamber in the background.

Below—The spray pond which cools the condenser water, thus reducing the water cost.

Carrier Phot



Forced Air Heating Facts From the Research Residence

S. Konzo

Special Research Associate
University of Illinois

In this article the author continues his explanatory articles on pressures in a forced-air heating system, particularly with reference to the ratings of fans. The discussion on fans was begun in the previous article and was preceded by several detailed articles on the nature of pressure losses.

Methods For Determining Fan Ratings

Introduction

THE discussion in the previous article can be briefly summarized in the following few paragraphs:

The designer of a forced-air heating system is interested in pressure losses in the system since an understanding of pressure losses enables the designer to size the ducts in a given installation so that the resistance of any single duct is not unusually large as compared with that of other ducts in the same installation. An understanding of pressure losses also enables the installer to select a fan which will be capable of delivering the required air volume against the frictional resistance in the duct system.

Unlike the concept that many people have, pressure losses in a duct system are not something new to deal with. In fact, the action of the relatively simple gravity warm-air furnace system is governed by the pressure heads which are created by the temperature differences existing in the system. The main differences in action between the gravity and forced-air systems is that the air in a gravity system is "drawn through" by a very slight pressure difference, whereas the air in a forced-air system is "pushed through" by the action of the large pressure created by the fan. In one respect, however, both systems are alike, since any resistance in the duct system tends to decrease the pressure head that is available for moving the air.

In selecting a fan for a given installation not only must the volume of air be specified, but also the resistance against which the fan is to deliver the air should be considered. In other words, the fan should be capable of delivering the air against some stated pres-

sure. Furthermore, a fan rating which is based on "free air delivery" is relatively worthless for a fan which is to be installed in a forced-air heating system.

The installer has few means available by which he may check the volume rating of a fan. Since the dealer is dependent on the manufacturer's rating of the fan, it should be evident that the dealer should insist on accurate ratings made in the proper manner.

Fan Test Code

The rating of a fan can be established by actual tests made in accordance with the "Standard Code for Testing of Centrifugal and Disk Fans", which has been adopted by the National Association of Fan Manufacturers and by the American Society of Heating and Ventilation Engineers. Details of the rating tests are available in the Code and are not of concern in this discussion, since such detailed matters are of interest only to the manufacturer of the fan. It is of importance to all users of fan equipment, however, to have some general idea of the manner in which the tests are made.

A line diagram of the essential parts of the apparatus necessary for testing a fan is shown in Fig. 1. It may be noted that the inlet to the fan is free and unobstructed and that the resistance (in the form of the added duct and shutter) is all on the outlet or discharge side of the fan. In other words, the resistance is imposed entirely on the discharge side in the case of the test arrangement, whereas in an actual fan installation the resistance to the flow of air is imposed on both the suction and discharge sides of the fan. See Fig. 2.

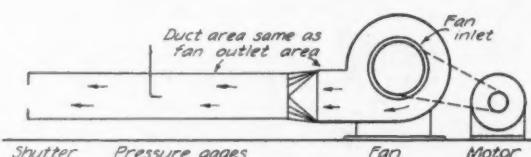


Fig. 1—Line diagram showing general arrangement of apparatus set up for testing fans and blowers.

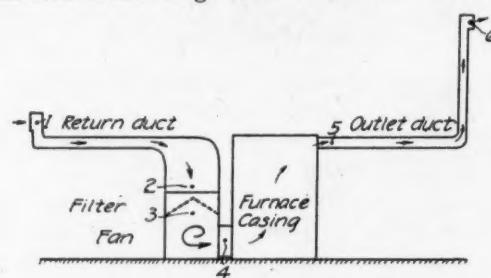


Fig. 2—Line diagram of actual duct installation showing resistance to air flow imposed on both suction and outlet sides of the fan.

This assumes, of course, that a fan which is rated to deliver 2,000 cubic feet per minute of air against a resistance of 0.25 inches will deliver that amount of air in an actual installation, whether that resistance is divided so that the suction resistance is 0.20 inches and the outlet resistance is 0.05 inches or whether all the resistance in the system is imposed on the discharge side. This assumption has not been disproven, although it may not be exactly correct, and for all practical purposes no discrimination is made in the matter. For instance, a resistance of 0.1 inch is regarded as having the same effect (0.1 inch) whether it exists on the suction side or on the discharge side.

It may also be noted in Fig. 1 that the area of the discharge pipe is made the same as the area of the fan outlet. Therefore, the average velocity of the air in the duct is the same as the average velocity of the air as it leaves the fan outlet. Consequently, a given fan rating of 2,000 c.f.m. against a static pressure of 0.25 inch assumes the existence of a very definite velocity pressure. In this case, as explained previously in the article on total pressures, the relation between the static pressure and total pressure is a fixed quantity for each air volume delivery.

The conditions in an actual fan installation are usually different from test conditions in that the area of the ducts connected to the fan is not the same as the area of the fan outlet. See Fig. 2. In fact, most cases, the maximum velocity in the duct system occurs immediately in front of the fan outlet and the velocities in the rest of the system are substantially lower.

In this case an air delivery of 2,000 c.f.m. against a $\frac{1}{4}$ inch static pressure will not be produced with exactly the same fan speed as that required when the rating test was made, because the velocity heads are not identical in the two installations.

Strictly speaking, the fan for a forced air heating system should be selected on a basis of total pressure only. That is, the losses in the duct system, when combined with the velocity pressure existing at the register face, should equal the static pressure and velocity pressure of the fan as stated in the rating. The relationships are shown in the following equations:

Exact Method

(a) Total pressure of duct installation—

$$(\text{Pressure Losses})_{\text{in duct}} + (\text{Velocity Pressure})_{\text{at register}} = (\text{Total Pressure})_{\text{of system}}$$

(b) Total pressure of fan—

$$(\text{Static Pressure})_{\text{of fan}} + (\text{Velocity Pressure})_{\text{at fan outlet}} = (\text{Total Pressure})_{\text{of fan}}$$

(c) By equating the left-hand terms in equations (a) and (b), we obtain—

$$(\text{Pressure Losses})_{\text{in duct}} + (\text{V. P. at register}) = (\text{S. P. of fan}) + (\text{V. P. at fan outlet})$$

(d) The total pressure in the duct installation should be equal to the total pressure as stated in the fan rating, or,

$$(\text{T. P. of system}) = (\text{T. P. of fan}) \text{ for any given air delivery.}$$

The method ordinarily used by most installers is an approximate method. The relationships are shown by the following approximation:

Approximate Method

(e) The items for "velocity pressure in system" and "velocity pressure at fan outlet" are omitted from equation (e).

$$(\text{Pressure Losses})_{\text{in duct}} = (\text{S. P. of fan}) \text{ for any given air delivery.}$$

It should be noted that for cases where the velocity pressure of the system is materially different from the velocity pressure of the fan, the approximate method may give results that differ considerably from the exact method.

For most ordinary domestic heating installations, the approximate method of selecting the fan gives results that are in fair agreement with the more precise method. At any rate, commercial practice has been such a dominant influence in this respect that very few installers use any but the approximate method. The writer shall, therefore, discuss fan ratings from this standpoint. It should be understood, however, that in unusually large installations and in installations that differ materially from conventional practice, some attention should be directed to the total pressure calculated in the duct system and the total pressure against which the fan is capable of delivering the air.

Typical Fan Rating Table

The selection of a fan which is capable of delivering a certain quantity of air against a stated static pressure requires a study of fan ratings as published in manufacturers' tables. These fan ratings are established from tests made in accordance with the Fan Test Code.

If the installer of the fan can specify the volume delivery required and the static pressure (or losses) which the fan must overcome, the fan manufacturer will be able to supply the following information, (a) type of fan, (b) fan speed required, (c) brake horsepower consumption, and (d) size of motor required.

The information in Table 1 which is reproduced from a manufacturers' catalogue is typical of the data available on the performance of fans. It may be noted that in this particular table the air deliveries are listed in column 1 in increments of 250 c.f.m. beginning with 1,000 c.f.m. and ending with 2,250 c.f.m.

TABLE 1

Typical Data Supplied by Manufacturer for Fan Rating

Delivery c.f.m.	Static Pressure			
	1 0.125	2 0.25	3 0.375	5 0.5
1000	r.p.m.	r.p.m.	r.p.m.	r.p.m.
1250	275	380	445	520
1500	300	395	460	532
1750	320	415	475	550
2000	345	425	490	570
2250	370	440	510	585
	395	460	525	605

The column headings across the table list the static pressure in terms of inches of water. The figures tabulated in the main body of the table represent fan speeds in revolutions per minute (or r.p.m.). It may be noted from the table that an air volume of 1,000 cu. ft. per minute (abbreviated to 1,000 c.f.m.) will be delivered

(Continued on page 46)

Effective Temperature—

[Part 2]

What it is; how it was established; what it is used for; its relation to the "Comfort Zone" and comfort chart; and how to use it.

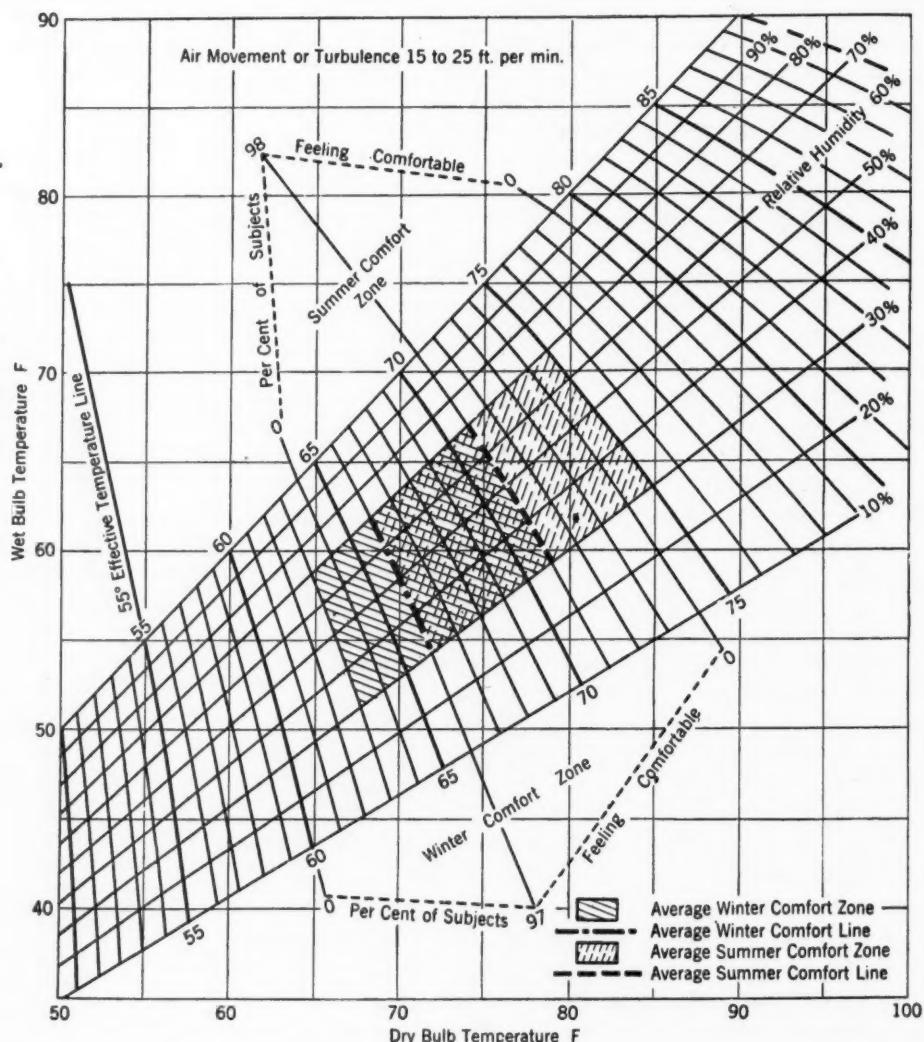
FIG. 2—COMFORT OR EFFECTIVE TEMPERATURE CHART FOR AIR VELOCITIES OF 15 TO 25 FPM (STILL AIR)

Note: Both summer and winter comfort zones apply to inhabitants of the United States only. Application of winter zone is further limited to rooms heated by central station systems of the convection type. The zone does not apply to rooms heated by radiant methods. Application of summer comfort zone is limited to homes, offices and the like, where the occupants become fully adapted to the artificial air conditions. The zone does not apply to theaters, department stores, and the like where the exposure is less than 3 hours.

ANOTHER confusing matter which requires clarification is the range of comfortable humidity. In some comfort charts the average winter comfort zone has been extended along the 63 and 71 degrees effective temperature lines beyond the experimental limits to include the entire range of relative humidity from 0 to 100 per cent. The implication here is, of course, not that either the very dry or the very moist air conditions are entirely comfortable, but that they are equally warm.

In the comfort zone experiments of the A. S. H. V. E. Research Laboratory the relative humidity was varied between the limits of 30 and 70 per cent approximately, but the most comfortable range has not been determined. In similar experiments at the Harvard School of Public Health, a relative humidity of 70 per cent was found to be somewhat humid in winter, by about half of the subjects who were stripped to the waist, even when the dry-bulb temperature was 70 F. or less. In summer, a relative humidity of 30 per cent was pronounced as a little too dry by about a third of the subjects wearing warm-weather clothing. So long as the temperature was kept within proper limits, the majority of the subjects were unable to detect sensations of humidity (i. e., too high, too low, or medium) when the relative humidity was between 30 and 60 per cent.

Until more exact information is secured, it



would be desirable to restrict the comfort zones to the range of relative humidity employed in the comfort zone experiments, namely 30 to 70 per cent. Relative humidities below 30 or slightly over 70 may prove satisfactory from the standpoint of comfort, so long as extreme humidities are avoided. From the standpoint of health, however, the consensus seems to favor a relative humidity between 40 and 60 per cent. In mild weather such comparatively high relative humidities are entirely feasible, but in cold or sub-freezing weather they are objectionable on account of condensation and frosting on the windows. They may even cause serious damage to certain building materials of the exposed walls by condensation and freezing of the moisture accumulating inside these materials. Unless special precautions are taken properly to insulate the affected surfaces it will be necessary to reduce the degree of artificial humidification in sub-freezing weather to less than 40 per cent, according to the outdoor temperature. The principles underlying humidity requirements and limitations are discussed more fully elsewhere.

The comfort chart (Fig. 2) embodies all the foregoing recommendations and is suggested as a tentative standard until more exact information is

secured. The variation in the sensation of comfort within the zones is indicated by the comfort scales which give the percentage of subjects feeling comfortable at the various air conditions.

The extreme winter comfort zone extends from a minimum effective temperature of 60 degrees at which all the subjects of the experiments were too cold, to a maximum of 74 degrees at which all the subjects were too warm. The average winter comfort zone shown by the area shaded with thin solid lines, is included between the 63 and 71 degrees effective temperature lines. In a similar way it can be seen that the limits of the extreme summer comfort zones are 64 and 79 degrees effective temperature, and those of the average comfort zone, shaded by thin broken lines, 66 and 75 degrees effective temperature. The variation from winter to summer is probably due to adaptation to seasonal weather as well as to seasonal variation in the clothing worn.

The comfort lines separate the cool air conditions on the left from the warm air conditions on the right. Under the air conditions existing along or defined by the comfort lines, the body is able to maintain thermal equilibrium with its environment, with the least conscious sensation to the individual, or with the minimum physiologic demand on the heat regulating mechanism. This environment involves not only the condition of the air with respect to temperature and humidity but also the condition of the surrounding objects and wall surfaces.

The comfort chart may be reproduced with the zones superimposed on the standard psychrometric chart or on any other suitable chart, but the essential features with respect to air movement and relative humidity limitations should remain unaltered.

Application

The average winter comfort line (66 degrees effective temperature) applies to average American men and women living inside the broad geographic belt across the United States, in which central heating of the convection type is generally used during four to eight months of the year. It does not apply to rooms heated by radiant energy. Even in the warm south and southwestern climates, and in the very cold north central climate of the United States, the comfort chart would probably have to be modified according to climate, living and working conditions, and the degree of acquired adaptation.

In densely occupied spaces, such as class rooms, theaters, auditoriums, and the like, somewhat lower temperatures are necessary than those indicated by the comfort line on account of counter radiation between the bodies of occupants in close proximity. In rooms in which the average wall surface temperature is considerably below the air temperature, higher air temperatures are necessary. The reverse holds true in radiant or panel heating methods.

The sensation of comfort, insofar as the physical

environment is concerned, is not absolute but it varies considerably among certain individuals. Therefore in applying the air conditions indicated by the comfort line the ventilating engineer should not expect all the occupants of a room to feel perfectly comfortable. When the winter comfort line is applied in accordance with the foregoing recommendations, the majority of the occupants will be perfectly comfortable, but there will always be a few who would feel a bit too cool and a few a bit too warm. These individual differences among the minority may be counteracted by suitable clothing.

It is sometimes argued that air conditions lying outside the comfort zone have been found perfectly comfortable to certain persons in cases in which the use of the comfort chart is advocated. If these claims are examined, it will be found that in the majority of them, if not in all, the authors did not appreciate the fact that they were referring to the average comfort zone, within which 50 per cent or more of the occupants of a room are expected to be comfortable. In other words, it is possible for half of the occupants of a room to be comfortable in air conditions outside the average comfort zone, but in the majority of cases, if not in all, these conditions will be well within the extreme comfort zone as determined experimentally.

The summer comfort line (71 degrees effective temperature) is applicable to the same geographic area as the winter comfort line. It is further restricted to cases in which the human body has reached thermal equilibrium with its environment. As a general rule this takes place after 1½ to 3 hours exposure. When a person from outdoors enters a room cooled to 71 degrees effective temperature on a hot day (95 F. or over) an intense chill is likely to be experienced which is unpleasant. However, after remaining in the room for about 2 hours, this fundamental optimum condition will prove satisfactory to the average person. The summer comfort zone, as well as the comfort line, makes proper allowance for these adaptive changes in the body, and thus applies to homes, offices, schools and other similar places where persons of sedentary occupations spend from 3 to 8 or more hours daily.

In artificially cooled theaters, department stores, restaurants, and other public buildings where

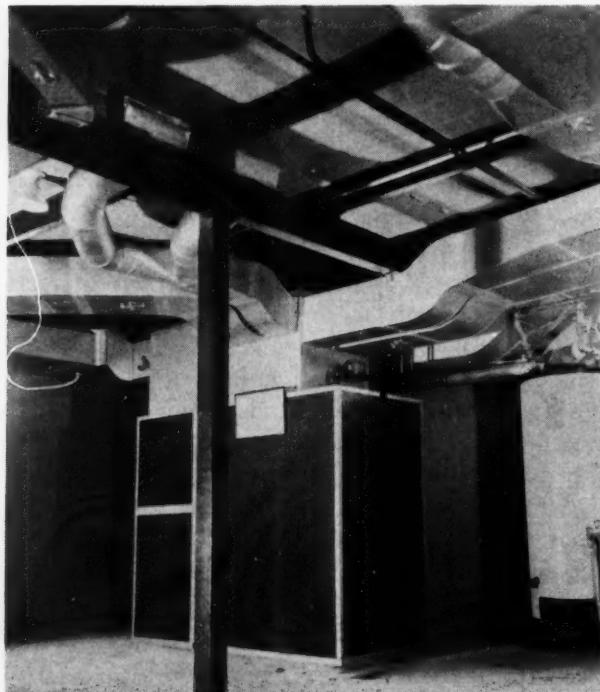
(Continued on page 44)

TABLE 1—DESIRABLE INDOOR AIR CONDITIONS IN SUMMER
CORRESPONDING TO OUTDOOR TEMPERATURES
Applicable to Exposures Less Than 3 Hours

OUTDOOR TEMP. (DEG. FAHR.)	INDOOR AIR CONDITIONS WITH DEW-POINT CONSTANT AT 57 F.		
	DRY-BULB	DRY-BULB	WET-BULB
95	80.0	65.0	73
90	78.0	64.5	72
85	76.5	64.0	71
80	75.0	63.5	70
75	73.5	63.0	69
70	72.0	62.5	68



Left—Exterior of the house, which is one of a pair of twins, built around a central court and pool. Below—The Trane gas furnace showing bonnet, rectangular mains and a few of the branches.



Rectangular Mains with Round Pipe Branches

The cover picture of our October issue showed an interesting round pipe from rectangular transition. Here is a description of the installation and the reasons why this type of distribution was used.

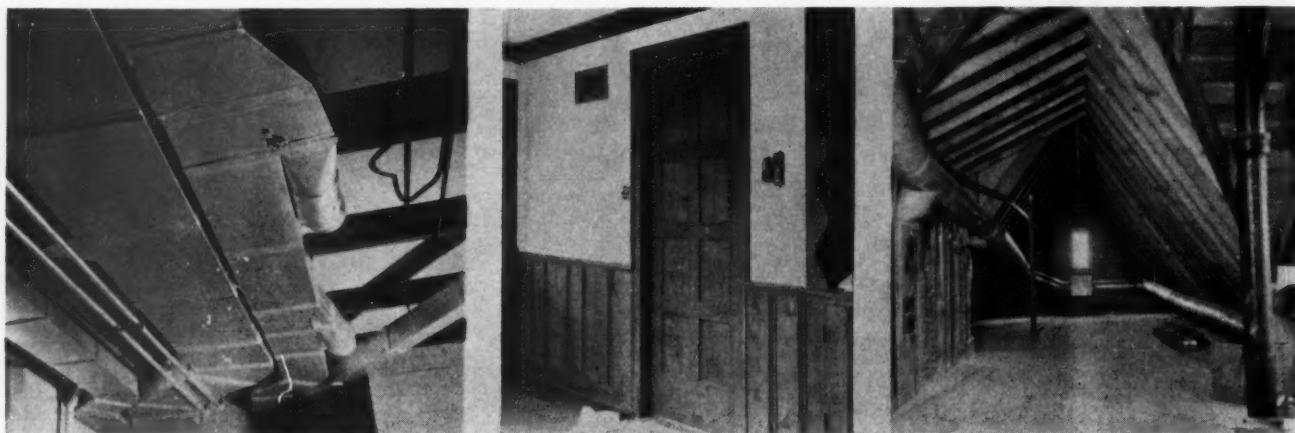
A NUMBER of letters have been received commenting on the type of branch take-off shown in the cover illustration of the October issue. Several contractors inquired—"What type of layout was used that such a fitting was found necessary?"

To answer these questions we take pleasure, therefore, in publishing photographs and plans of the job from which the October cover picture was taken. The installation is in Hinsdale, Illinois, and was designed and installed by the Home Heating and Air Conditioning Co., of Hinsdale. J. W. Peter-

son, the owner, is secretary of the DuPage County Warm Air Heating and Sheet Metal Contractors Association and has been one of the active sponsors of the Illinois state licensing act.

Describing the apparatus and installation, Mr. Peterson says:

"This system was installed in a distinctive type of home which was built for sale. Air conditioning was selected because it was considered a valuable sales help in the ultimate sale of the building. A gas-fired unit was selected because, obviously, a home of this character warrants completely automatic heating—hence a unit designed for automatic fuel. A feature which helped in the selection of the particular equipment used was appearance, in



Left—Closeup of return and supply mains showing transition for round branch pipe, standing seam cleats, and dampers. Center—View of dining room wall showing humidistat and thermostat and one high side wall register. Right—Bathroom, kitchen and garage are ventilated by a separate system which converges in the attic where an outside wall fan exhausts air from all rooms connected into the exhaust system.

that it has no resemblance to an old-fashioned hot air furnace.

"A complete air-conditioning furnace was selected having a capacity of 200,000 B.T.U.'s per hour. This unit is integral, in that furnace, blower, burner, humidifier, filters and controls are all included with the unit and each is a necessary part of a winter air-conditioning system.

"The supply system is based on the Mechanical Code with some variations. Rather than the room basic factor, the B. T. U.'s are used and the factor .013 to find C. F. M. instead of the code factor of 11.6 at 145 degrees register temperature. While the code makes a correction of 13% in the area factor (to correct for 135 degrees register temperature), it is well to know the correct C. F. M. at the temperature selected.

Factor .013 is from the formula

B. T. U.

C. F. M. equals

Density \times .24 \times T. R. \times 60

The branches are 8 in. round pipes with boots made of the size shown in column 8 on the rectangular end. While the ducts were sized in accordance with the Mechanical Code I believe the friction method the better because the smaller pipes are apt to be too small (due to greater friction).

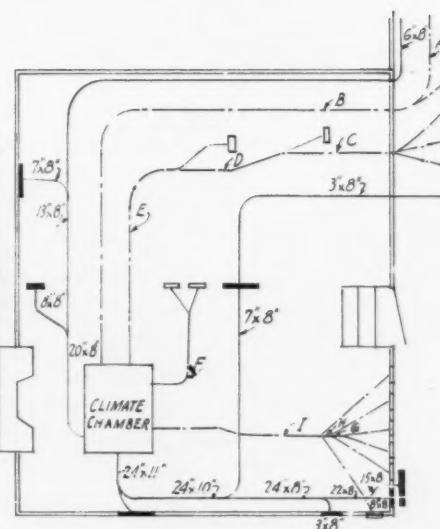
"The return system includes withdrawing air from the garage and bath rooms through the use of an attic exhaust fan and expelling it outdoors. For this reason an extra infiltration load has been figured on other rooms."

The contractor has prepared an interesting data sheet which gives pipe sizes according to designated pipe numbers on the piping plan. The two studied together present a complete picture of the rectangular to round takeoffs and resulting branches.

Incidentally, this installation was one of those selected last winter for field test. Due to difficulties in selling the house, permission to test was not secured in time to give a fair picture of the results.

We show piping and floor plans of the house

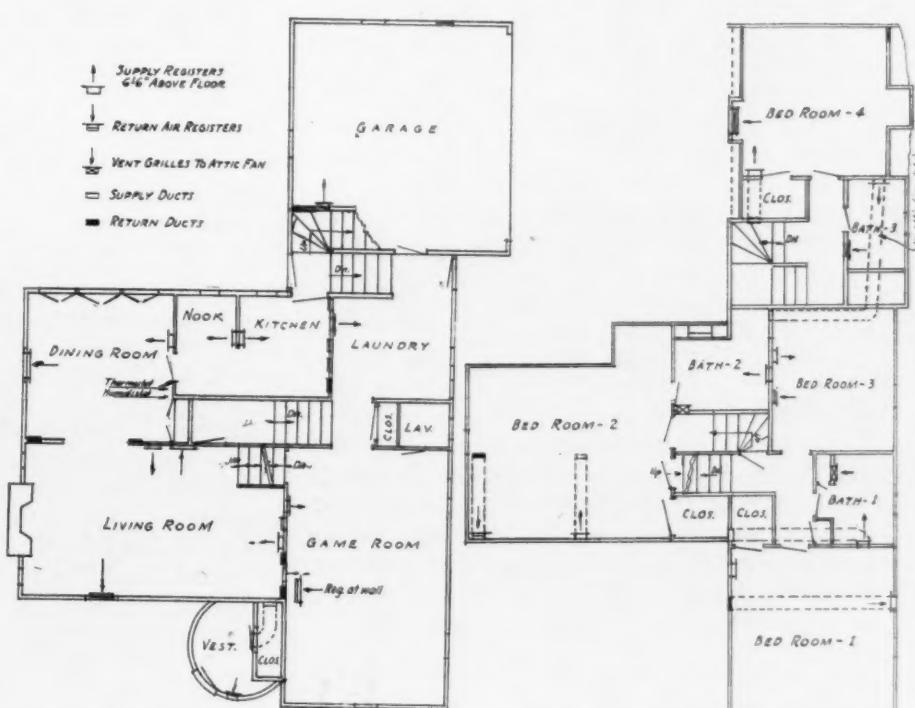
Diagrammatic layout of the supply and return systems showing arrangement of pipes which made possible the fitting shown on the October cover. The fitting appears in the lower right corner.



from which readers can see the layout of runs of pipe, location of registers and returns, sizes and application of the system to the type of house.

SUPPLY SYSTEM

Room	B.T.U.	C.F.M.	B.T.U.	Branch	Main	Register
	x .013	Outlets	Per Outlt.	Area	Round	Duct
	x .013		x 24	x 24	x 24	Size
Bed No. 4 . . .	12,118	158 1	158 38	7.0	6x8 . . .	14x 8
Garage	29,781	387 1	387 93	10.9	14x7 118	A 14x10
Bath No. 3 . . .	3,119	41 1	41 10	4.0	2½x8 115	B 12x5
Bath No. 2 . . .	2,781	36 1	36 9	4.0	2½x8 . . .	C 12x 5
Bed No. 3 . . .	6,205	81 1	81 19	5.0	3x8 . . .	D 12x 6
Laundry	9,478	123 1	123 30	6.2	5x8 52	E 12x 8
Kitchen	4,405	58 1	58 14	3.8	3x8 60	F 12x 5
Din. Rm	12,155	158 1	158 38	7.0	6x8 88	G 14x 8
Liv. Rm	11,679	151 2	76 18	4.8	3x8 . . .	H 12x 6
Bed No. 2	15,017	195 1	195 47	7.8	7x8 58	I 14x 8
Liv. Rm	151 2	75 18	4.8	3x8 . . .	J 12x 6	
Game Rm	20,221	262 2	131 31	6.3	5x8 44	K 12x 8
Bed No. 1	13,440	174 1	174 42	7.3	6x8 . . .	L 14x 8
Game Rm	262	2	131 31	6.3	5x8 105	M 11.6 14x8
Bath No. 1 . . .	2,670	35 1	35 9	4.0	2½x8 . . .	N 12x 5
Vest'le	3,827	50 1	50 12	4.0	2½x8 113	O 12.0 16x8



First and second floor plans showing locations of registers and return air faces, stacks and the attic exhaust system. Note that all registers are 8 feet 6 inches above the floor. Also multi-registers in several of the larger rooms.

Insulation For House Construction*

By J. D. Hoffman

Professor of Practical Mechanics
Purdue University

[Part 7]

This article brings to an end the interesting and valuable discussion by Professor Hoffman. During the series he has presented facts showing the savings in money and the increased winter and summer comfort made possible by the use of insulation. Numerous typical applications of insulation have been shown, together with methods for calculating insulation value when the heat transmission coefficient of each material is known.

Chimneys*

Another source of annoyance and waste in the operation of small residence plants is the unsatisfactory operation of the heating plants, due to unsuitable chimneys. In chimney operation, height produces draft and net cross-sectional area gives capacity. That is to say, the higher the chimney the greater the "pull" on the chimney gases and the less the danger of smoking at the furnace. Also, the larger the net cross-sectional area of the chimney the more coal may be burned in a given time without choking the chimney enough to kill the draft. These two factors, height and area, are interdependent and each should be considered with the other. In this connection some general facts should be observed.

Chimney Height. The least height of a chimney for residences is variously stated at 30 to 35 feet. Chimneys less than 30 feet are likely to be erratic in their action. One would not be safe in saying that no chimney less than 30 feet should be built, because many one to one-and-one-half-story houses have chimneys less than this. It is correct, however, to say that if the owner wishes at all times to have a good draft during any weather conditions that may prevail, a chimney less than 30 feet in height should not be put in. The furnace codes approved by the various engineering societies interested in furnace heating, give as a least value, 26 feet above the furnace grate, which, certainly, should be considered a minimum in all cases.

Necessary Area

Cross-Sectional Area. In residences, the cross-sectional area more frequently causes trouble than the height. The ideal section for any air duct is round. This does not work in very well with the brick work, however, and a square section should be approached as nearly as possible, keeping in mind that whatever shape is adopted it must fit the usual sizes of bricks. In many chimneys already built the cross-section is

long and narrow, the least dimension being the width of one brick ($4\frac{1}{2}$ inches). This is entirely too small to give good service. Because of the mortar burr projecting from the joints between the bricks, this dimension is frequently as small as 4 inches. There is a dead zone next to every frictional surface (that next to an ordinary brick wall is extravagantly large) which is ineffective as free area. The gases moving along such a surface do not slide, but roll and tumble, thus further restricting the free passage up the chimney.

In such a chimney as the one described, having a thin rough flue, this neutral zone may be sufficient practically to nullify the entire draft area. One prominent authority states that this zone extends a distance of 2 inches or more from each brick surface toward the center of the chimney. From a practical standpoint, therefore, a nominal 4-inch by 12-inch standard chimney flue is very much less effective than an 8-inch by 6-inch flue, if such could be constructed. In practice, no chimney flue should be made of less internal area than a nominal 8-inch round or 8-inch square. In moderate-sized houses, say 8 to 10 rooms, the working conditions of the chimney are improved if this is enlarged to a nominal 8-inch by 12-inch; and in large houses, say 12 to 15 rooms, to 12-inch square.

Linings

Chimney Lining. All chimneys should be lined with the best fire-clay flue lining throughout the entire length of the chimney, the lining to be not less than $\frac{3}{4}$ -inch thickness. This is especially necessary if the chimney is built of a single thickness of brickwork or of a cement block construction. There are two reasons for this. The smooth interior of the lining eliminates a large amount of the friction usually found between the moving column of gases and the inner surface of the brickwork, and in addition, lining is a safeguard against fire, since it covers up any open joints or cracks which often occur in the average mortar joint in one-brick walls.

An examination of many attic chimneys will reveal such cracks. They are easily distinguished by a

*Reprint of Extension Series No. 31, Engineering Extension Department, Purdue University.

**From Bulletin No. 2, Engineering Extension Department, 1923.

**Prices quoted, \$40.00 to \$60.00.

feather of black soot and dust around the opening.

Gas Pressure Causes Fires

In normal operation, the draft within the chimney is sufficient to cause the surrounding air (say attic air, because most of the roof fires begin in the attic), to pull inward toward the chimney. When a heavy deposit of soot collects upon the inner surface of the chimney and this is fired by an extra hot fire in the furnace, the volume of gases trying to escape from the top of the chimney is so great that the "pull" of the chimney is overcome and a reverse condition takes place. The pressure within the chimney now is greater than that of the air without and the hot gases are forced out through the cracks to the attic, igniting any combustible material in their path. Many of our mysterious roof blazes could probably be traced to this one defect in chimney construction. Linings effectually cut off gas leakages to the house, but emphasis should be laid upon the fact that the lining should be of the best and strongest quality, each section end being well bedded in a good mortar joint.

Interior-Exterior Chimneys

Interior vs. Exterior Chimneys. Convection of air or gases (their tendency to rise and mix) is due primarily to heat. Any body of gas upon being heated expands and becomes lighter. Since all gases are, comparatively speaking, perfectly fluid, the lighter (warmer) volumes rise and the cooler and heavier

volumes fall, an interchange due to gravity. It can easily be seen, therefore, that a protected chimney that keeps the gases from losing their heat as they pass up the chimney will produce a better draft than one which is not well protected and permits the gases to lose their heat. That is to say, an interior chimney (one running up through the house, inside the outside walls) will give more uniform draft than one built up as a part of the outside wall.

The effect of the cold winds upon an exposed chimney is to make an erratic draft. When a fire is started, the column of cold air within the chimney must be forced out before the warmer and lighter gases can circulate. Occasionally this causes a smoking furnace or fire-place until the chimney becomes heated, and even then, the draft may continue to be sluggish as long as the cold wind strikes directly against the chimney wall. When the cold wind is not directly against this side of the house, the conditions would not be noticeably bad. Inside chimneys are not subjected to such erratic conditions and are to be recommended for best furnace service. In making this recommendation the writer is not unmindful of the fact that the outside chimney has become very firmly established as an architectural feature in the home. There is no desire to change this attitude.

Construction

The outside chimney lends itself not only to outside but to inside decorative effect and may be used whenever desired, with proper restrictions. First, if a consistent draft is demanded for all weather condi-

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tions, the chimney should be double walled on the outside at least as far up as the eaves; second, if the heating furnace is to be attached to this chimney flue, it should be done with a full knowledge that the draft may be bad just on those days when the best draft is desired. It should also be remembered that heat radiated by an inside chimney goes to heat the house but that from an outside chimney is a total loss. It is recommended that the heating unit (warm-air furnace or boiler) be connected to an inside chimney only, unless the outside chimney be made at least 8 inches thick on the exposed walls.

Other points to be considered in chimney construction may be stated very briefly.

All chimneys should extend to the basement floor and should rest upon suitable foundations to prevent settling and cracking.

All chimney flues should extend below the smoke pipe openings and should have convenient clean-outs at the lowest point.

No other smoke connection than the furnace pipe should enter the chimney flue.

All chimneys should extend two to three feet above the highest point of the roof. Those that are overshadowed by a nearby building may require a "cowl" to prevent downdraft when the wind blows over that building.

The woodwork of the building should never be rigidly fixed to the chimney. This is frequently done and is the source of much annoyance in the raising and lowering of floors, doors, etc., as the expansion and contraction of the chimney takes place. In the winter when the house is at its least size, the chimney has expanded to its greatest length, and in summer the reverse conditions prevail. This requires the frequent trimming at top and bottom of all partition doors near the chimney to avoid binding, a condition which would not exist if the chimney were at liberty to expand and contract free from any house restrictions.

Summary

Residences throughout the country embody many structural imperfections that should and could be eliminated. The one type of residence which houses the vast majority of the people is the framed-wall type. This type is open to the greatest variety of interpretations as to what is good or what is bad construction. In an endeavor to create improved standards of construction and thus protect the average householder from unnecessary expenditures, as well as to assist in the general problem of conservation, all residents of the state should interest themselves in a movement toward the betterment of these conditions. Attention should be directed especially toward an improvement in the insulating qualities of the outer walls on all framed houses, toward the better protection of the windows against excessive inleakage, toward the insulating of all attic spaces, toward the sheathing of all studded walls between any room and attic spaces, and toward the proper location and construction of the chimney flues.

[The End]

November, 1935

AMERICAN ARTISAN
Air Conditioning
Section

41

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1. The inadequate or inefficient system, troubled with distant cold areas and spotty heating.
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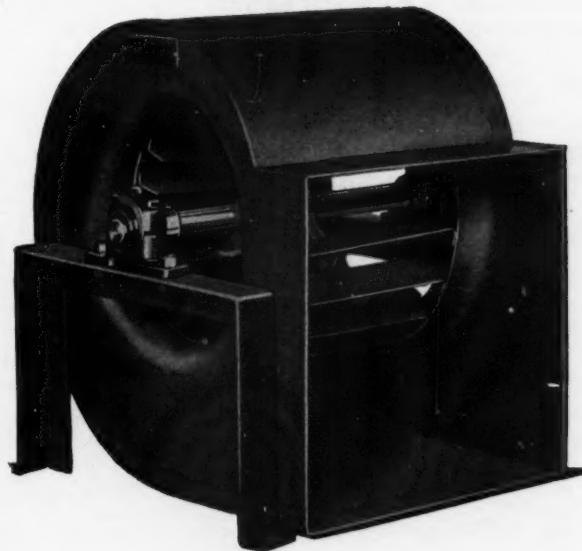
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The “Buffalo” is QUIET, essential to a satisfactory installation. This is due to low tip speed, rubber padded bearings of the bronze and graphite-lined sleeve type, and to the die-formed inlets.

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Dearborn Inn

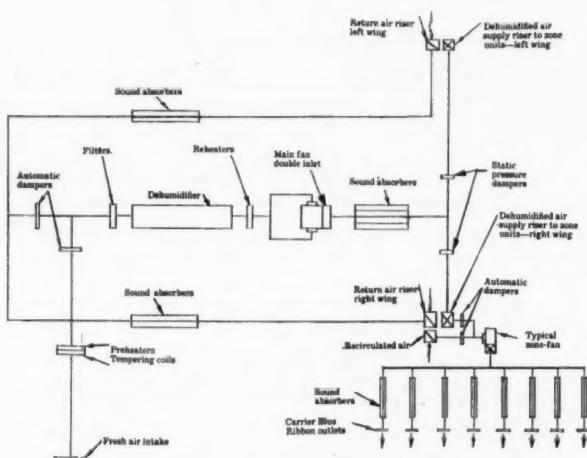
(Continued from page 31)

ducts in the corridors: one recirculated air duct leading to the zone unit, and the other one leading back to the main conditioning chamber where the air is cleaned, cooled, and dehumidified.

Coffee Shop Distribution

Extreme quietness of operation is obtained by lining all supply ducts with a seaweed material known as "Cabot's Quilt," which filters out noise. This particular sound absorber is also impervious to moisture. Furthering quietness of operation are Celotex strips used on the return air registers to "straighten out" the air flow as it is pulled into the zone units by fans.

To cool the water used in the air washer a Carrier centrifugal compressor powered by a 250-hp.



Arrangement of the various elements that make up the air-conditioning installation. At the lower right is illustrated the arrangement for a typical "zone."

motor and with a rated capacity of 250 tons of refrigeration has been installed. Carrene No. 2 is the refrigerant used.

Water-Cooling Tank

Water used in the air washer to condition the air is cooled in a water-cooling tank which is constructed as part of the centrifugal machine, and in which the refrigerant is sprayed over the water tubes under pressure to speed up evaporation and cooling. Water is cooled to 45° F. and supplied to the air washer at the rate of 600 g.p.m.

This water cools air in the main conditioning chamber to 52° F., at which temperature it is supplied to the zones through the two main supply ducts.

The engineer in charge regulates the speed and operation of the compressor by checking the temperature of the water as it returns to the cooler. According to the hotel's chief engineer, there is a time lag of about an hour before a change of any consequence in the outside temperature is felt.

FURNACE BLOWERS

Single, double, triple and quadruple assemblies, for use in ventilating and exhaust systems.

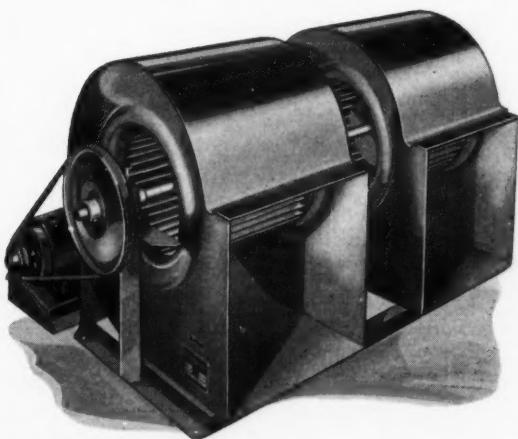
These blowers are designed and built for use with domestic warm air furnaces, but they can be used equally well for cooling and ventilating purposes in small theatres, retail stores, etc.

The fan wheels are of strong welded construction and are given a careful dynamic and static balance assuring quiet operation. The housings are die formed and of welded construction available for any angle of discharge.

The units can be furnished with drip pans and casings for mounting and housing cooling coils when mechanical refrigeration is to be used.

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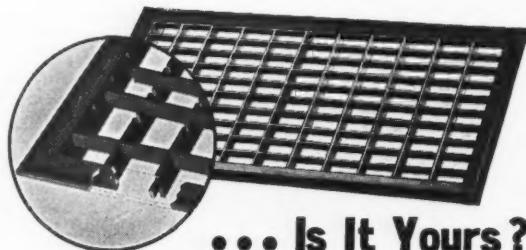
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MANUFACTURED BY
CHANDLER COMPANY
CEDAR RAPIDS, IOWA

Dearborn Inn

(Continued from page 42)

In the summer the return air from the corridors and lobby is mixed with the outside ventilation air in the plenum chamber, and is then carried through the filter and the two banks of air washer sprays (equipped with eliminator plates to keep moisture from being carried through) to the zone units by a constant-speed fan with a rating of 35,000 c.f.m.

For winter operation there is a tempering coil and a pre-heater in the fresh air intake, and a re-heater coil beyond the two banks of sprays. Between the last bank of sprays and the re-heater control is a dew point control, which controls the operation of all the heating elements in the main conditioning system, so that the air being recirculated constantly throughout the building is at a definite wet-bulb temperature. Actual job of heating the building is done by steam radiation units in the various rooms.

Effective Temperature

(Continued from page 35)

the period of occupancy is short, the contrast between outdoor and indoor air conditions becomes the deciding factor in regard to the temperature and humidity to be maintained. The object of cooling such places in the summer is not to reduce the temperature to the optimum degree, but to maintain therein a temperature which is temporarily comfortable to the patrons who thus avoid sensations of chill and intense heat on entering and leaving the building. The relative humidity should be low enough (about 50 per cent) to give a sense of comfort without chill and to induce a rate of evaporation which will keep clothing and skin dry. For exposures less than 3 hours, desirable indoor conditions in summer corresponding to various outdoor temperatures are given in Table 1.

F. H. A. Progress

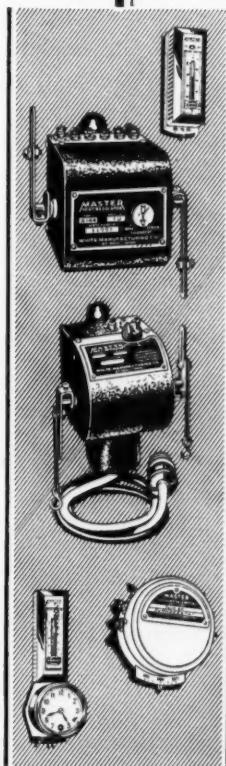
Building activity advanced in every part of the country last month, as more and more persons took advantage of the Federal Housing Administration's Modernization Credit Plan and "Single Mortgage System."

During the week ending October 26 there were 15,990 loans under the Modernization Credit Plan reported by financial institutions. These totaled \$5,321,840. That brought the total loans reported since the start of the modernization program 14 months ago to 515,159, valued at \$190,660,564—all private capital.

Financial institutions reported 1,533 mortgages selected for appraisal totaling \$5,116,292 during the same week. The cumulative total since the start of the mortgage program last December is 53,074, amounting to \$205,306,531—also all private capital.

The field officers of the Housing Administration reported that \$26,310,854 worth of modernization and repair work had been developed by the program during the week ending October 26, but not financed by the Modernization Credit Plan. This figure brings the total work developed since the start of the program to \$990,001,327.

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MASTERHEAT REGULATOR
is like the reliability
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FITS EVERY DEALER'S AIR CONDITIONING REQUIREMENTS

One of the chief essentials of success in dealing in air-conditioning sales is to have a line that is complete. Trane offers a proved line of products that fit your every requirement and one which enables you to meet any specification. Whether it be 1—the Large Capacity Cooler for big installations; 2—the Climate Changer for residential work; 3—the Product Cooler for product storage; 4—the Propeller Unit for small store work; or 5 and 6—De Luxe Floor and Ceiling models for residential or office work you require or just TRANE Coils for central systems, you will find that they have been tested on recent installations and found satisfactory in every way. Why not check below the unit that interests you and write for complete information.

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5. Cabinet Cooler
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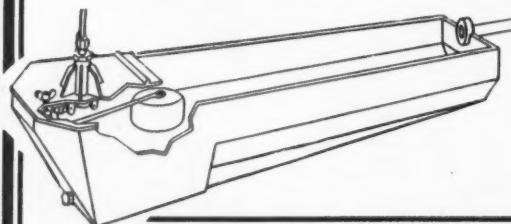
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CHICAGO, ILLINOIS

Konzo, Research Residence

(Continued from page 33)

against a 0.125 in. static pressure, if the given fan is rotated at 275 r.p.m. Similarly it may be noted that when any air volume of 2,250 c.f.m. is delivered against a static pressure of 0.5 in., the required fan speed is 605 r.p.m.

Fan ratings may be, and frequently are, listed in a variety of ways. The relationship between air volume delivery, static pressure, and fan speed is however a very definite one for each fan. It is possible not only to present the fan ratings in the form of tables similar to Table 1, but also to present the data in the form of

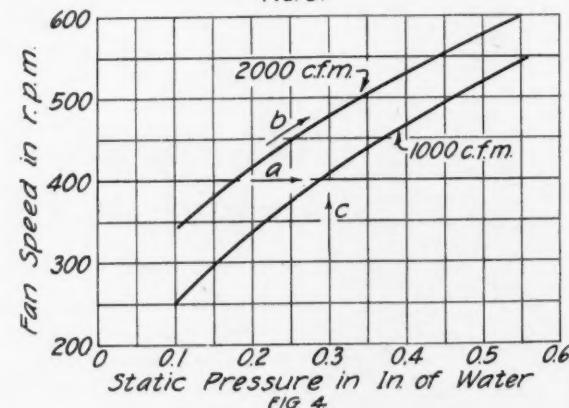
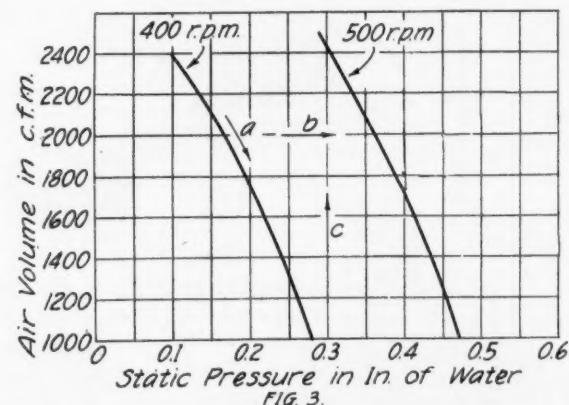


Fig. 3 and 4—Typical performance curves for a fan.

curves, which show very clearly the relations involved. Fig. 3 shows one method of representing fan ratings. In this particular example the same values used in Table 1 have been used.

It may be noted in Fig. 3 that the static pressures are represented on the horizontal scale, and the air volume deliveries are represented on the vertical scale. The following relationships may be deduced from the two typical curves shown on Fig. 3:

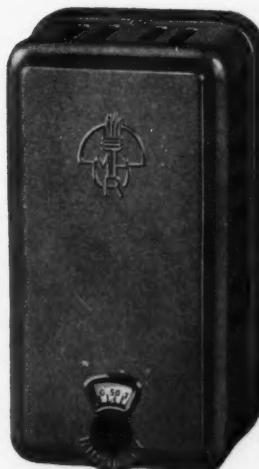
a. For a given fan speed (say 400 r.p.m.), an increase in the static pressure results in a decrease in air delivery by the fan. (Follow the direction arrow marked *a* in Fig. 3).

b. For a given air volume (say 1,600 c.f.m.), an increase in the static pressure requires a corresponding increase in the fan speed. (Follow the direction arrow marked *b* in Fig. 3).

c. For a given static pressure (say 0.3 in. gauge) an increase in fan speed results in an increase in the

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Humidity Control. Very accurate, with exceptionally small differential. Range 20 to 80 per cent relative humidity . . .

MINNEAPOLIS-HONEYWELL Air Conditioning Controls govern all phases of this work, including heating, cooling, ventilating, humidifying or de-humidifying. There are controls for every application, each designed to accomplish its particular function with characteristic Minneapolis-Honeywell accuracy and efficiency. Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minn. Branch and distributing offices in all principal cities.

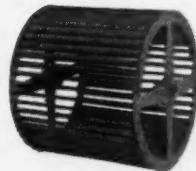
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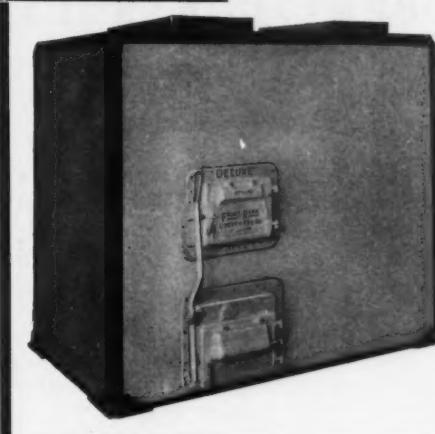


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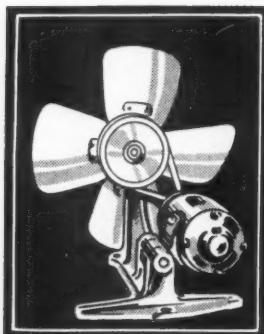


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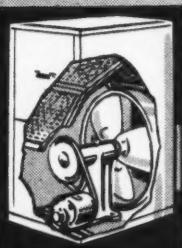
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Here is something brand new—not just another blower—but an entirely new and proved principle of filtering and heating the air in winter—of filtering and cooling it in summer—and at a price the average home owner can easily afford to pay.

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DAYTON, OHIO

LIVE DEALERS WANTED—The Dayton Furnace Unit is a distinct money-making proposition for you—a Quality Product—sound merchandising plans—substantial profits—and backed by a sound company—It's to your interest to write today for our new proposition.



COOK HEAT CONTROLS for Gravity—Forced Air— Zone Control



This Heat Control contains every desirable feature for the best operation of a domestic heating plant. Slow opening and closing of the draft and check door results in gradual changes in the combustion chamber.

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Safety Features. In event of current failure, the COOK Heat Control will always close the draft and open the check door.

QUIET

Quiet—There are no moving parts to lubricate; no mechanism to adjust; no motors, springs, gears or dry batteries. There is no service.

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Regardless of how good your furnace and installation is, the success of the installation is entirely in the operation of the controls. The best is the kind you should use. Cook equipment will give your customer complete satisfaction, demand no service, and assure you a profit.

Cook Equipment Is Built to a Standard—Not to a Price

COOK ELECTRIC CO.
2700 Southport Ave. Chicago

air volume delivery. (Follow the direction arrow marked *c* in Fig. 3).

The very same data presented in Fig. 3 may also be represented in another manner as illustrated by Fig. 4. In this figure the same horizontal coordinates are used, but the vertical ordinate is now in terms of fan speed. *It should be emphasized that the data in Table 1, Fig. 3 and Fig. 4 are all alike.* The only difference is in the manner of presentation of the data. The relationships between fan speed, static pressure, and air volume which were shown by the direction arrows in Fig. 3 are also shown in Fig. 4. For instance it may be noted in Fig. 4 that:

a. When the fan speed is 400 r.p.m., increasing the static pressure from 0.17 in. to 0.28 in. resulted in a decrease of air volume delivery from 2,000 c.f.m. to 1,000 c.f.m. (Follow the direction arrow *a* in Fig. 4 and also in Fig. 3).

b. When the required air volume is 2,000 c.f.m., increasing the static pressure from 0.17 in. to 0.35 in. required an increase in fan speed from 400 r.p.m. to 500 r.p.m. (Follow the direction arrow *b* in Fig. 4 and also in Fig. 3).

c. In order to deliver air against a static pressure of 0.3 in. gauge, a fan speed of 410 r.p.m. will be required to deliver 1,000 c.f.m. and a fan speed of 475 r.p.m. will be required to deliver 2,000 c.f.m. (Follow the direction arrow *c* in Fig. 4 and also in Fig. 3).

Power Requirement Rating

In addition to the preceding data, most fan ratings also list the power requirement of the fan. In this

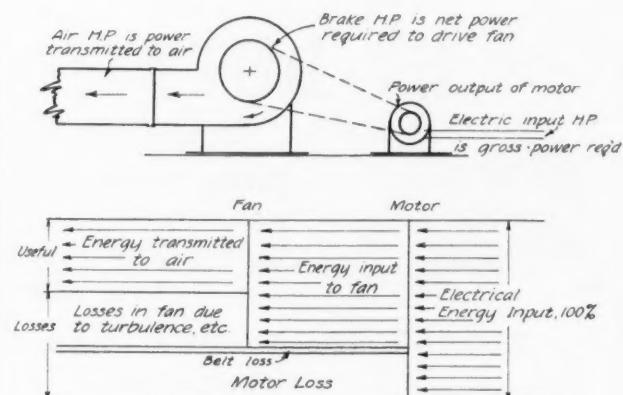


Fig. 5—Diagram showing energy conversions for fan and motor.

connection, it should be noted that three distinct items for horse-power ratings are available, as follows: (See diagram in Fig. 5.)

(1) The horse-power required to turn the fan is equivalent to the net power required. Except for a small loss in the belt transmission between the fan and the electric motor, this net horse-power is equal to the *power output* of the electric motor. This horse-power is designated as *brake horse-power* and is usually abbreviated to *b.h.p.*

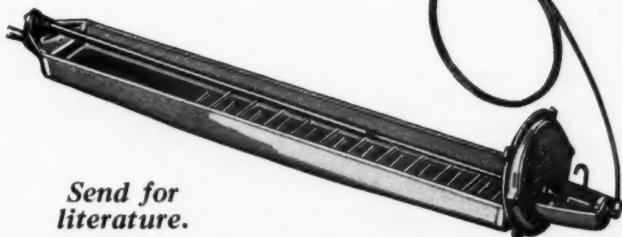
(2) The horse-power required to turn the electric motor is equivalent to the gross power required and is equal to the *power input* of the electric motor. This gross, or input, horse-power includes the brake

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is neither "Drip" nor "Float" type. It is the **ONLY HUMIDIFIER** that supplies moisture **AUTOMATICALLY** in **CORRECT PROPORTION** to the heat generated. Easy to install—No service calls. Not affected by Hard Water or changes in Water Pressure.

Operates equally well with any Fuel.

Will improve any
Warm Air System.



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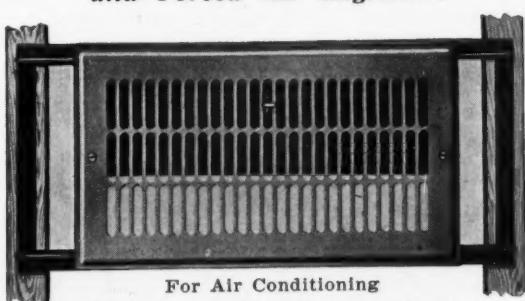
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Monarch $\frac{3}{4}$ " Fig. H-261 male or Fig. 642 female pipe thread brass nozzles are recommended. Capacities from .57 to 18.17 G.P.H. at 40 lbs. The 2.20 gal. size at 25 lbs. is mostly used.



Fig. F-27

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$\frac{3}{4}$ "
Fig. H-261

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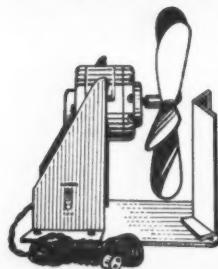
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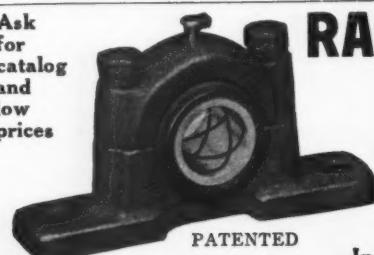
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Insist on Randall Pillow Blocks on all blowers, fans and air-conditioning units. Get longer, trouble-free service.

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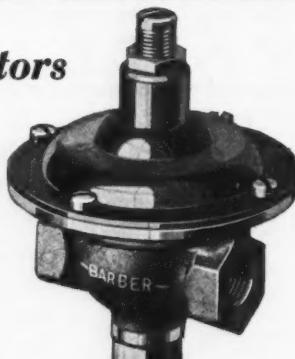
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CLEVELAND - - - - OHIOMade in $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", $\frac{1}{4}$ ", $1\frac{1}{4}$ ", $1\frac{1}{2}$ " and 2" sizes.The Humidifier that Satisfies is the
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Sizes for All
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Humidifier
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Automatic Humidifier Co., Cedar Falls, Ia.

horse-power, as well as the power loss in the electric motor. The input horse-power to the motor is always numerically greater than the brake horse-power of the motor.

The efficiency in transforming the electric energy (or input h.p.) to useful work in turning the fan (or b.h.p.) is determined by the following relation:

$$\frac{\text{Electric motor}}{\text{efficiency}} = \frac{\text{B.h.p.}}{\text{Input h.p.}}$$

(3) The "air horse-power" as may be noted from Fig. 5 is a measure of the rate of energy transmission to the air and is the final outcome of all the energy transformations involved in the process. Numerically the "air horse-power" may be derived by the substitution of the proper values in the following equation:

$$\text{Air H. P.} = \frac{5.2 \times \text{T.P.} \times \text{c.f.m.}}{33,000}$$

where T.P. = total pressure in in. of water and c.f.m. = air volume delivery in cubic feet per minute.

The "fan efficiency" is determined by the following ratio:

$$\text{Fan efficiency} = \frac{\text{Output from fan}}{\text{Input to fan}} = \frac{\text{Air H.P.}}{\text{Brake H.P.}}$$

In practically all fan rating tables only the item for brake horse-power is included, since that item represents the net power required to turn the fan. The in-

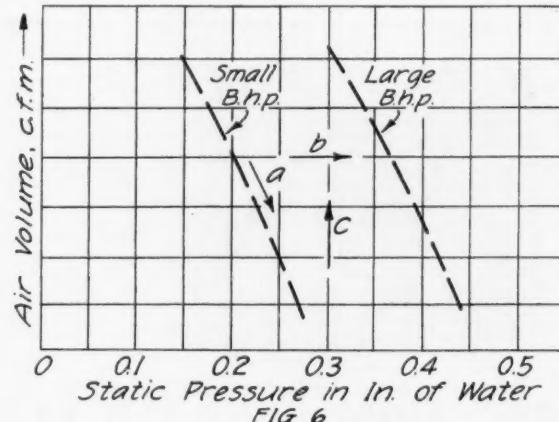


FIG. 6

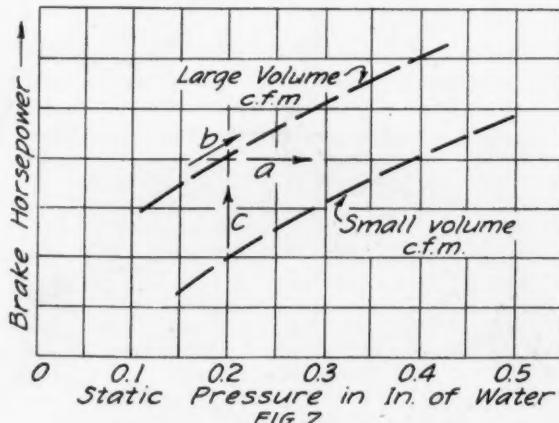


FIG. 6 and 7—Typical performance curves showing power requirement for fans.

put horse-power required to produce a given b.h.p. will depend entirely on the characteristics of the electric motor used to drive the fan and hence is not ordinarily listed in fan rating tables.

In many rating tables for fans, such as is shown in Table 1, a value for brake horse-power is shown adjacent to the values for r.p.m. Except for a difference in the magnitude of the figures, the values for brake horse-power vary in about the same manner as the values of r.p.m. which are listed in the Table. As a consequence, the general relationships which were listed between fan speed, c.f.m., and static pressure apply equally well in most cases when the item for brake horse-power is substituted for fan speed.

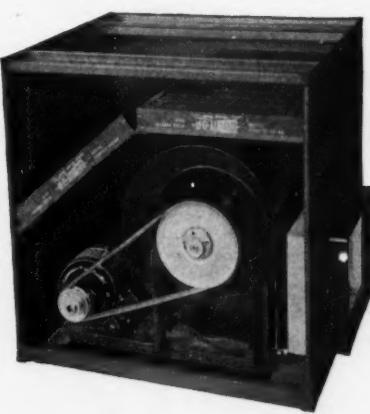
The curves in Fig. 6 are similar in character to those in Fig. 3; also the curves in Fig. 7 are similar in character to those in Fig. 4. The only difference is that brake horse-power is substituted in every case for r.p.m.

The following relationships may be deduced from the two typical curves shown in Fig. 6 and 7:

(a) When a fan is operated so as to maintain a given brake horse-power requirement, any increase in the static pressure necessitates a corresponding decrease in air delivery by the fan. (Follow the direction arrows marked *a* in Figs. 5 and 6).

(b) When a fan is operated so as to deliver a given air volume, any increase in the static pressure requires a corresponding increase in the brake horse-power. (Follow the direction arrows marked *b* in Figs. 5 and 6).

(c) When a fan is operated against a constant static pressure, any increase in the brake horse-power input to the fan results in an increase in the air volume delivery. (Follow the direction arrows marked *c* in Figs. 5 and 6.)



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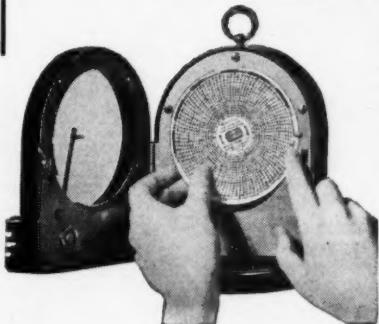
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Now you can prove to your prospects that your equipment gives top-notch service. With such proof you can make more sales, just like other dealers who are using Practical Instruments.

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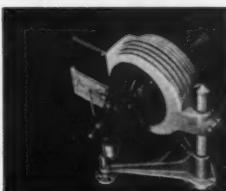
Thousands of oil burners in
the homes of America this
winter will fail.

They are old.

They are worn out.

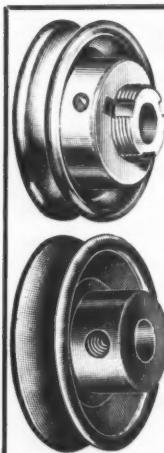
This 1935-36 winter replace-
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Plan today to replace with a
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There's no need to tell you how many of your troubles start with improper draft. Put a Hays draft gage in your kit bag as a trouble shooter and a trouble preventer too. It will tell you without guesswork, the exact draft pressure and defective flues or blower troubles will be shown at a glance.

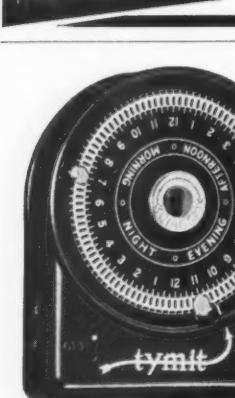
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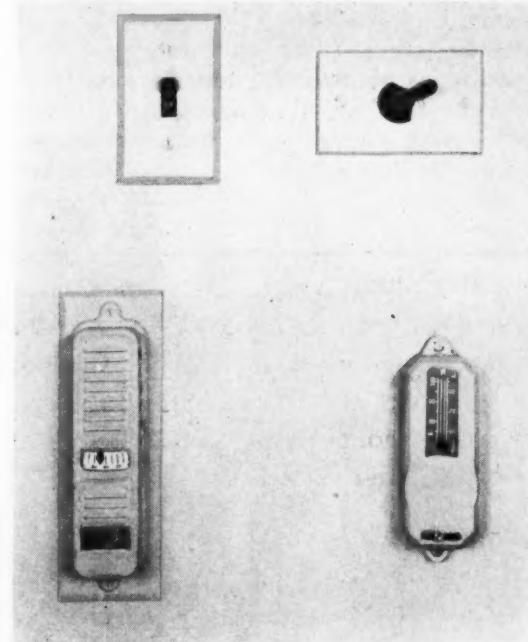
Name
Address
City State

Zone Control

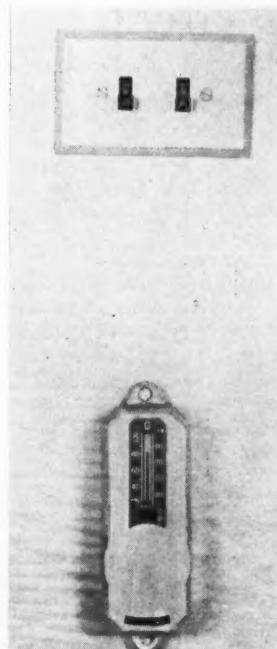
(Continued from page 29)

being maintained at even, comfortable temperatures, and the thermostat response proving very sensitive, with no undesirable time lag.

It may be that the most practical application of this idea will be to room cooling applications, where a single compressor and set of evaporator coils is



used to cool a number of different rooms, such as a group of small offices or a number of residence rooms, in conjunction with a system of supply and return air ducts. A thermostat located in one office or bedroom to start and stop the compressor might



The illustration above and the picture to the left shows the control instruments for the system.

not maintain satisfactory temperature conditions in the other rooms. On the other hand, a thermostat with a bulb in the stream of return air from all the rooms will maintain a representative average temperature and give more satisfactory results.

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When people are shivering . . . when the heating system does not operate up to par . . . when it needs the assistance of a fine forced air system . . . then is your time to step in with a Furblo Package Unit, which can be installed without even extinguishing the fire in the furnace.

Firecrackers are sold for the Fourth of July and when it's cold (six to eight months) is the time to sell a FURBLO Package Unit to make poorly circulating furnaces really heat. It is compact, efficient, economical, automatic. It is a profit maker for you—it should be your leader this season.

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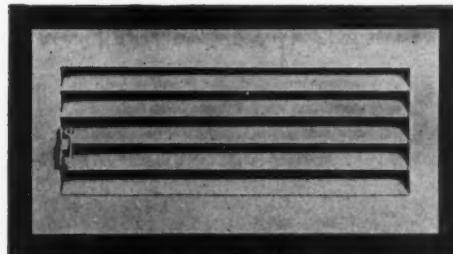
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The FAIRWEATHER Air Conditioner is the result of many years of scientific research and engineering skill. It brings, at moderate cost, complete winter air conditioning for the home. Investigate its tremendous possibilities.

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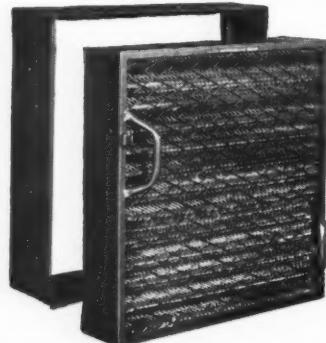
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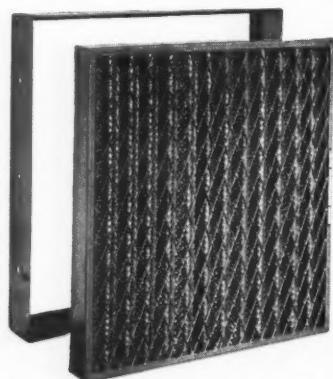
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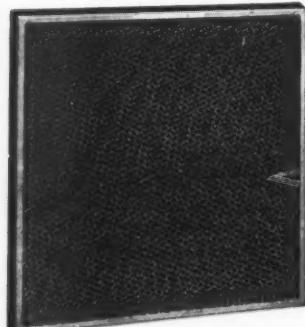
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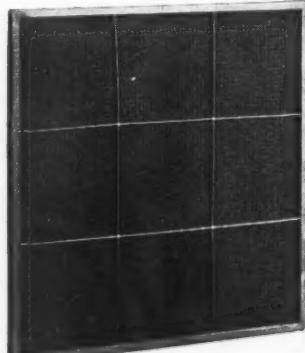
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The Minneapolis Heating, Ventilating and Air Conditioning Ordinance [Part 2]

PART VI

MINIMUM REQUIRED CHIMNEY AREAS FOR STEAM AND HOT WATER BOILERS AND WARM AIR FURNACES, AND REQUIREMENTS FOR SMOKE PIPES.

Section 601. Owner's Duty to Provide Proper Chimney: It shall be the duty of the owner of any building in which it is hereafter proposed to install any warm air furnace or steam or hot water boiler for use in connection with a heating system in such building, to provide a properly constructed chimney to which to connect such furnace or boiler, which chimney shall be or be made smoke tight throughout and shall contain a flue not less in area and height than as hereinafter provided for in this section of this ordinance.

Section 602. Required Areas and Heights for Chimney Flues: Except as hereinafter provided, each steam or hot water boiler or warm air furnace hereafter installed for use in connection with a heating plant shall be connected to a chimney flue the area and height of which shall not be less than those specified in the following Table No. 17 for boiler or furnaces of like capacity:

Required chimney flue sizes for boilers and furnaces with capacities larger than those specified in Table No. 17 and for installations where more than one boiler or furnace are

The first Minneapolis code was formulated in 1926. This revised code, made effective this spring, was written chiefly by the Building Inspection Department from its experience. Until this year the Minneapolis code has been eminently satisfactory—as proof—heating firms decreased from 133 to 40 between 1926 and 1935. This year lack of funds has necessitated economies admitting some violations but more building is raising revenue. More of the code will be published next month. We will gladly answer questions.

warm air furnace whose leader pipe area capacity does not exceed one thousand (1,000) square inches may be installed and connected to said chimney if the area of the flue of said chimney be not less than fifty (50) square inches, and a proportionately greater area of chimney flue shall be required when the capacity of the steam or hot water boiler or warm air furnace to be connected thereto is greater than above specified, all subject to the approval of the Inspector of Buildings; and said inspector is hereby authorized and empowered to require such increase in the height of any such chimney flue, or such other changes, as he may deem necessary to help compensate for lack of flue area and insure safety. Such chimney flue of reduced area shall have no other vent or smoke pipe connected thereto.

602.1. Fuel Restriction with Chimney Flues of Reduced Areas: It shall hereafter be unlawful for any person, firm or corporation to burn, in any steam or hot water boiler or warm air furnace attached to a chimney flue of reduced area such as hereinbefore provided for in this section of this ordinance, any solid fuels having more than twenty-one (21) per cent volatile matter content, and any violator of this provision of this ordinance shall be subject to the penalties hereinafter provided.

Section 603. Smoke Tests Required, When: All flues to which heating boilers or furnaces are to be connected hereafter shall be subjected to and must successfully withstand a smoke test before such connection is permitted by the Department of buildings, which test shall, in the case of new chimneys, be made after the mortar has set. Such smoke test shall be made by building a smudge fire at the bottom of the flue, using tar paper or similar material to create the smudge, and, when the smoke is flowing freely from the top of the flue, closing it tightly at the top, all heater or vent openings into said flue to be tightly closed before test is started and the clean-out opening to be left open for draft. All leaks in any such flue disclosed by such test to be closed and made tight before the chimney is accepted or a heating plant connected thereto. It shall be the duty of the owner to make such test or to have the same made, at his expense, and such test shall be made in the presence of the Inspector of Buildings and of said owner or his representative. Not more than one flue in the same chimney shall be tested at one time. All chimneys in buildings that have been moved to new locations shall be tested in the above manner before being put into use. The Inspector of Buildings may order and require that existing chimneys be similarly tested, and repaired or rebuilt as may be necessary to make them tight and safe.

Section 604. Smoke Pipes, Required Weight of Metal for: For each and every steam or hot water boiler

TABLE NO. 17
CHIMNEY FLUE SIZES

Warm Air Furnace Capacity in Sq. In. of Leader Pipe	Steam Boiler Capacity Sq. Ft. of Radiation	Hot Water Heater Capacity Sq. Ft. of Radiation	Nominal Dimensions of Fire Clay Lining in Inches	Actual Inside Dimensions of Fire Clay Lining in Inches	Rectangular Flue		Round Flue	
					Actual Area Sq. In.	Inside Diameter of Lining in Inches	Actual Area Sq. In.	Height in Ft. Above Grate
790	590	973	8 1/2 X 13	7 X 11 1/2	81			35
1,000	590	973						
	690	1,140				10	79	
	900	1,490	12 X 13	11 1/4 X 11 1/4	127			
	1,100	1,820				12	113	40
	1,700	2,800	13 X 18	11 1/4 X 16 1/4	183			
	1,940	3,200				15	177	
	2,130	3,520	18 X 18	15 3/4 X 15 3/4	248			
	2,480	4,090	20 X 20	17 1/4 X 17 1/4	298			
	3,150	5,200				18	254	50
	4,300	7,100				20	314	
	4,600	7,590	20 X 24	17 X 21	357			
	5,000	8,250	24 X 24	21 X 21	441			
	5,570	9,190		24 X 24 *	576			
	5,580	9,200				22	380	
	6,980	11,500				24	452	65
	7,270	12,000		24 X 28 *	672			
	8,700	14,400		28 X 28 *	784			
	9,380	15,500				27	573	
	10,150	16,750		30 X 30 *	900			
	10,470	17,250		28 X 32 *	896			

*Dimensions are for unlined rectangular flues.

or warm air furnace hereafter installed under the provisions of this ordinance, the area of the breeching or smoke pipe shall not be less than the area of the smoke collar of the boiler or furnace to which it is connected, and each such breeching or smoke pipe shall be made of material equal in durability to galvanized iron of thicknesses (U. S. Standard Gauge), for the various areas of such breechings or smoke pipes, not less than the following:

For areas from 50 to 78 square inches, No. 24 gauge; for areas from 79 to 115 square inches, No. 22 gauge; for areas from 116 to 177 square inches, No. 18 gauge; for areas from 178 to 314 square inches, No. 16 gauge; for areas from 315 to 1,017 square inches, No. 12 gauge; for areas from 1,018 to 2,827 square inches, No. 10 gauge.

Section 605. Smoke Pipes, How Installed: Each such breeching or smoke pipe shall be provided with a proper damper, conveniently located; shall be lock-seamed or riveted, with all joints lapped not less than one and one-half (1½) inches, and be rigidly secured; and shall have proper thimble for making tight connection to chimney flue.

Each such breeching or smoke pipe shall be as short and direct to the chimney flue as possible, and shall be installed with a pitch upward of not less than one-fourth (¼) inch per running foot.

PART XI

GRAVITY WARM AIR HEATING

Section 1101. Definitions: For the purposes of this ordinance the following definitions shall govern as to the meaning of the several terms and expressions so defined, wherever said terms and expressions are employed in this ordinance:

(a) A warm air furnace shall consist of a direct fired heater, over the exterior surface of which the air passes, to be directly heated by the radiant heat of combustion.

(b) A gravity warm air heating plant shall consist of one or more warm air furnaces, enclosed within casings, together with necessary appurtenances thereto, consisting of warm air pipes and fittings, cold air or recirculating pipes, ducts, boxes and fittings, smoke pipes and fittings, dampers, registers, borders, faces and grilles, the same being intended for heating the buildings in which they may be installed.

The incorporation of a booster fan, as hereinafter defined, in a gravity warm air heating plant, shall not be construed as changing the classification of such system.

(c) A "booster fan" shall be taken to mean a fan incorporated in a gravity warm air heating plant for the purpose of acceleration of the air circulation therein.

Section 1102. Warm Air Leader Pipes and Stacks, Sizes of: In connection with any gravity warm air heating plant in any building, no warm air leader pipes or wall stacks shall hereafter be installed of sizes less than those determined in the following manner:

1102.1: Determine the heat loss in B.T.U., as set forth in Part II of this ordinance, for room to be heated.

Then
Leader pipe area for first floor room,
$$\text{sq. ins.} = \frac{H}{111}$$

Leader pipe area for 2nd floor room,
$$\text{sq. ins.} = \frac{H}{166}$$

Leader pipe area for third floor room,
$$\text{sq. ins.} = \frac{H}{200}$$

where H = heat loss in B.T.U. of room to be heated.

The above formulae are applicable to straight leaders not exceeding twelve (12) feet in length. Where warm air leaders exceed twelve (12) feet in length or have more than two (2) 90 degree turns, exclusive of elbow at boot, pipe at least one commercial size larger shall be used.

1102.2 Wall Stacks, First Floor Rooms: All first floor fittings and connections shall maintain a free area equal to the round basement pipes leading to them.

1102.3 Wall Stacks, Second and Third Floor Rooms: Area to be not less than seventy (70) per cent of calculated basement pipe area as determined in Sub-Section 1102.1.

This Minneapolis Code is the most complete ordinance we have seen. Its sections cover every possible type of installation and all proper methods of designing and installing each type of system. In Part I (published in the October issue) the method of procedure after securing a job was set forth. This issue covers selection of smoke pipe size and weight and the design of a gravity warm air system. Later sections will cover forced air, air conditioning, automatic firing devices. We call your particular attention to the fact that no item of design or installation is left to chance—everything is covered specifically.

1102.4 Where two (2) or more rooms are heated from the same basement pipe and stack, the area of such basement pipe and stack shall equal the combined required areas for such rooms, as determined in Sub-Sections 1102.1 and 1102.3.

1102.5 Transition from warm air pipes to stacks or register heads shall be made with a well designed elbow or boot.

Section 1103. Size of Registers: All registers shall have a free area at least equal to the area of the basement pipes leading to them, and shall be of the approximate width of the stacks or fittings to which they are attached.

Section 1104. Size of Furnace: Add together the leader pipe areas (expressed in square inches) necessary for heating the building, as determined by the foregoing calculated requirements set forth in Sub-Section 1102.1 of this

ordinance, and install a furnace rated by the following formula:

Furnace Rating Formula:

$$L = 1.75 G [1 + 0.02 (R - 20)]$$

where

L = square inches of warm air leader pipe area connected to the furnace, as calculated.

G = grate area in square inches; the area of the fire pot at the grate level, its most restricted area,

R = ratio of heating surface area to grate area;

$$1.75 = \text{a constant.}$$

This formula allows 1.75 square inches of warm air pipe area for each square inch of grate area for a furnace having a ratio of heating surface area to grate area of 20 to 1. For furnaces having other ratios of heating surface area to grate area, add two (2) per cent for each unit by which such ratio exceeds 20 to 1 and deduct two (2) per cent for each unit by which it is less than 20 to 1.

Definition: The heating surface is hereby defined as all surfaces of the furnace body inside the casing, above the grate level, in contact with fire, flame or hot gases on one side, and circulating air on the other side, and the surface area of the air side of such portion of the furnace body shall, for the purposes of this ordinance, be considered the heating surface area of the furnace.

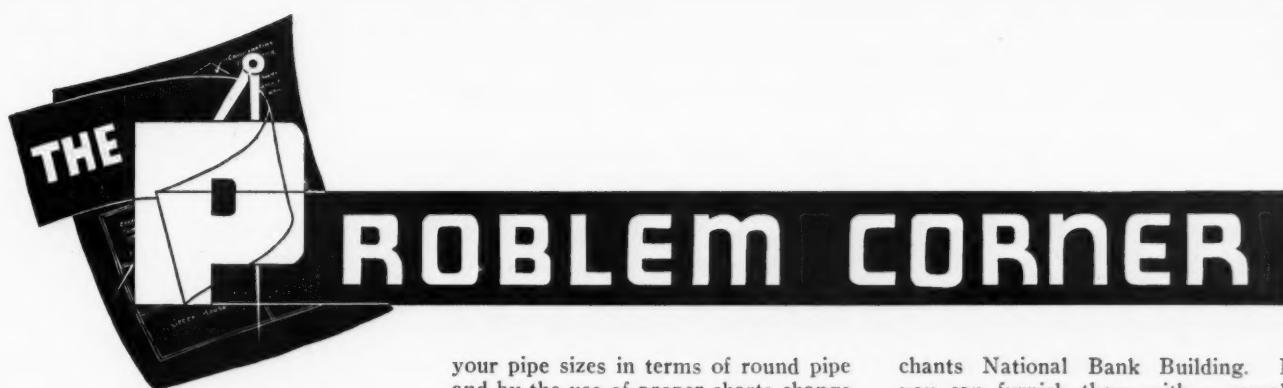
1104.1 Second Floor Heating: For second floors, where separate heating plants are used, add fifty (50) per cent to the total net calculated areas as determined in Sub-Section 1102.1, which represents the required furnace capacity in square inches of leader pipe area. Leaders and stacks need not be increased in size, however.

1104.2 Limitation of Rating Formula: The foregoing furnace rating formula shall be applicable only to furnaces of the common type of construction having round fire pots and ratios of heating surface to grate area falling between 15 to 1 and 30 to 1, and shall not be applicable to furnaces of special construction or equipped with unusual special features, nor to fuels varying materially from 12,000 B.t.u. per pound. In all cases where the foregoing rating formula is not applicable, as above provided, the Department of Buildings shall determine the proper rating in accordance with the best engineering practice.

1104.3 Certified Ratings Lacking, Capacities Determined, How: Where certified ratings of warm air furnaces, by the manufacturers thereof, in accordance with the above formula, are not filed with the Building Inspection Department as required hereby, then the capacities of such furnaces shall be determined by multiplying the square inches of grate area by 1.5.

1104.4 Gas or Oil Fired Furnaces: In the application of any gas or oil fired furnace to any gravity warm air heating system, deviations from the requirements of this ordinance shall be allowed only in connection with the furnace itself and shall be subject to the approval of the Department of Buildings. The rating of each such gas or oil fired furnace shall be determined by said Department in accordance with the best engineering practice.

(To be continued)



THE PROBLEM CORNER

Register Area

Should the free area of a register for both the warm air and the cold air return be the same as the area of the leaders or stacks in a forced air system? I should think that the friction caused when the air strikes the register even though the register has the same free areas as its leader would cause a back flow of air sufficient to lower the velocity. What is the proper way to figure the free area of a register so as not to change the velocity of the air coming from the leader?

The code for mechanical systems does not size the pipes according to equal friction per foot of duct. What do you recommend as the best method for sizing ducts?

S. W., Rhode Island.

Reply by The Editors

The usual procedure in forced air heating systems is to employ registers no wider than the stack due to the fact that it is both expensive and difficult to diffuse air across a register face wider than the stack in the small area available at the stack head.

The register should be selected to have a "free area" equal to the stack area.

Contractors frequently try to decrease register velocity by employing a register face higher than the stack, but under many circumstances the air passes through only a portion of the register face leaving the remainder without any appreciable air movement. This defeats the purpose of larger register faces and unless vanes or diffusers are employed there may be little gained by using a register larger in area than the stack or boot.

With reference to your second question, the Mechanical Code sizes piping by the 10 per cent reduction method. In other words, if you have two branches of 100 square inches each joining the main which supplies the two branches, it is figured—100 plus 100 minus 20 equals 180 square inches.

We recommend that the method for sizing forced air ducts is by the equal friction per running foot method. Using this method, you establish the resistance for the longest run or the highest resistance in any one main and branch and design all piping to this resistance. In order to do this, you must calculate

your pipe sizes in terms of round pipe and by the use of proper charts change round pipe sizes to rectangular ducts. The velocity increases as we go back to the bonnet, but when the system is completed all mains and branches will have the same resistance per running foot and, theoretically, we should be able to deliver the amount of air desired without the use of any dampers or balancing of the piping.

Actually, this does not always work out exactly in practice, but it does give us an air flow so close to the designed flow that very little dampering is required. This is much to be preferred, especially on the larger size jobs where hasty calculations may result in some branches having considerably less than their designed C. F. M. and the contractor not being able to reduce flow through other pipes to give the desired flow through the one which is short of air.

chants National Bank Building. If you can furnish them with a sample stained door, they will be able to advise you as to the best method for cleaning it.

Standard Code

American Artisan:

Will you please tell us the proper way to figure gravity warm air installations? Some contractors around here claim that the Standard Code is not proper.

H. C. W., Illinois.

Reply by The Editors

To our knowledge and for all ordinary purposes the Standard Code, is to our way of thinking the most satisfactory method of figuring a gravity installation. The code is the result of hundreds of tests at the Research Residence in Urbana, backed up by the experience of hundreds of contractors and engineers over a period of many years.

Furnace Pipe

American Artisan:

We have a customer who wants us to install a smoke pipe somewhat better than the usual galvanized iron pipe. We would like to know if sheet brass or sheet copper of about 24 or 26 gauge would prove satisfactory for this service. Or perhaps you have some other metals to suggest that would be better than any of the above?

S. S. S., Penna.

Reply by The Editors

Sheet copper of 24-gauge is quite satisfactory for furnace pipe. There is some argument in the industry as to whether or not copper lasts any longer than heavy galvanized iron, but results seem to depend directly upon the type of fuel used. Some fuels, having a high sulphur content, bring about rapid deterioration of practically any metal.

Some contractors, particularly where gas fired units are used, employ stainless steel pipe and while this is rather expensive and has not been in use long enough to prove its length of life, contractors are having very good success with it.

The Problem Corner

Church Trouble

American Artisan:

We have been experiencing some trouble with a heating job in one of our local churches.

The representative for our furnace manufacturer made all the measurements for the job and laid out the preliminary sketch from which the blueprints were taken and an installation designed. We hauled the old gravity furnace to the factory and rebuilt it for forced air. The job was installed according to the original design, but was found to be at fault so a 40 by 12 Uni-flow grille replaced the 40 by 20-inch grille at the front of the auditorium; two 18 by 30-inch wood faces were installed in the railing of the balcony to relieve the hot air pocket in the balcony, and a cold air duct was built to take cold air from the back of the auditorium under the balcony using a 14 by 30-inch C. A. face under the pews.

Even that was not sufficient so an outside cold air duct was built to introduce air directly into the fan box and thus build up pressure in the church and additional C. A. ducts and faces were installed as shown in pencil on the blueprints which we are sending to you. Our manufacturer made a special trip to make a series of tests and pronounced the job as nearly perfect as it could be made.

However, some members of the congregation (influential members) declare that there is too much cold draft on the east side of the church and too much cold draft on the floor all over the auditorium. There is a balance on the contract price of the installation and they refuse to pay this until the job is satisfactory.

Perhaps some of the readers of the Problem Corner have had experience with church floor drafts and will tell us what caused the draft and what remedies were applied. A drawing of this trouble job might help, but the church is the customary rectangle with warm air registers in the walls either side of the pulpit, a balcony exhausted as explained above. Warm air comes in the front and cool air leaves at the rear. Suggestions will be welcome.

F. R. M., Iowa.

Reply by W. J. Hennessey, Lincoln, Nebr.

Usually a cold floor complaint arises from the fact that the return air supply is concentrated in two locations. By breaking up this concentration the amount of air going to any one place on the floor will be smaller and will be taken care of without having to move any distance on the floor. By extending the 8 by 24-inch supply duct in the basement (as indicated) the basement ceiling will be maintained at

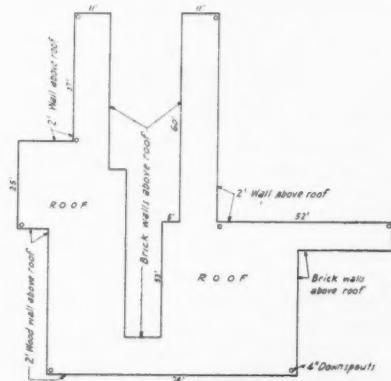
higher temperature and the floor temperature of the first floor will be higher so as to counteract the feeling of cold air moving. The outlets on the duct should never be closed even if the basement is not being used. The blower control should be set up to 225 degrees to get an outlet temperature of 175 degrees at zero outside and the total volume of air should not exceed 2400 C.F.M. Reducing the amount of air circulated will help materially.

The outlet velocity at the first floor warm air supply should not be less than 1000 C.F.M. to get good distribution of heated air in the building. At a designed register temperature of 140 degree at zero outside under normal weather conditions around 35 degrees you would have an outlet temperature of about 90 to 100 degrees and air moving at these temperatures less the drop of temperature from the outlet to the return face will feel cold.

What Kind of Roof

American Artisan:

Enclosed you will find a sketch of a roof. Will you please advise what is the best type of roof to install?



This roof has only one half inch pitch to the foot, so please, also, tell us how you would install your recommended roof.

P. S., Mississippi.

Reply by The Editors

The roof plan which you submitted appears to be a roof on a building set-back or to be surrounded by walls of other buildings and other parapets.

You state that the pitch of the roof is only one-half inch per foot. This means that water will stand on it or parts of it and, therefore, some form of roofing which is completely waterproof must be employed.

The Copper and Brass Research Association, 25 Broadway, New York City, recommend that for any roof with a pitch of less than 3 inches to the foot, a flat seam soldered copper

roof be employed. This will undoubtedly be the best type of roofing you can use, but the cost will be considerable in view of the rather large roof areas.

We believe that you can get a full set of suggested specifications by addressing the Copper and Brass Research Association, but in writing them we suggest that you include a little more information on the various types of surrounding walls in order that they may give you correct information on the proper flashing.

Ordinarily, we would say that this type of roof will be covered by a built-up, composition felt and asphalt or pitch roof similar to the bonded roofs of any of the manufacturers of well-known, built-up roofs.

Specifications for several types of roofs, depending upon the life which you desire, may be obtained by addressing the manufacturers, each of whom has sets of specifications and full instructions for installing. We are sure that any one of the firms will be glad to give you complete information.

Tar in Furnaces

American Artisan:

Will you kindly let us know if there is any remedy for the black tarry substance which forms in chimneys where wood is burned, as fireplace chimneys? We have just cleaned out some chimneys where there had been an explosion from this substance and we were asked if anything could be done to prevent this condition. We think that it is resin in the wood which forms this substance.

E. W. W., Illinois.

Reply by The Editors

We do not know just what the substance from burned wood is, but on occasion have burned Indiana or Western Kentucky soft coal and this deposits throughout a furnace or boiler a thick, tarry substance which cannot be removed excepting by scraping off with a sharp edged tool.

Some contractors suggest the use of a soot remover. We have not tried this out and can only tell you that contractors say it works under certain circumstances.

We tried removing this tar by spraying over the tarred surface a quantity of gasoline. This seemed to burn away a good deal of the tar and dry it out so that it can readily be scraped off the surfaces. As you can appreciate, this is rather dangerous as you cannot spray the tar and then build a fire as the gasoline evaporates; hence, the gasoline must be sprayed on the surface when there is fire in the boiler and if you have put gasoline in a boiler with a fire then you know how it shoots out the fire door.



ASSOCIATION ACTIVITIES

Indiana

Director Voorhees and I have covered the State of Indiana pretty thoroughly within the past six weeks. We have found business decidedly on the uptrend in every part of the State. Some places are enjoying the greatest rush of business they have had in many years and most places are showing a decided increase over any volumes during the past three years. In addition to this there is universal optimism as to the outlook.

The wisest of the contractors realize that they are confronted with an opportunity to get out of the red. They are, of course, anxious to protect their customers. This means that they have to do their own figuring, and not follow the unfortunate practice of allowing the purchaser to set prices and terms. Satisfactory terms can be arranged through cooperation with the F. H. A., but proper pricing must be adhered to. The old practice of stinging one customer and taking a loss on another is not going to be followed by any contractor who deserves to stay in business.

This, of course, points toward two things, first the getting together of the contractors in a spirit of friendly cooperation, and second, the operation of the business on a business-like basis, both as to estimating and as to production.

O. Voorhees, who is chairman of the program committee for the Indiana State Convention, which will be held in Indianapolis January 21-22-23, is fully cognizant of this situation and is planning the Convention program to meet this demand. He is working up a program which will be interesting and which will attract contractors of all classes from every part of the State.

With this in mind we are figuring on a demonstration of labor saving equipment as a part of the State program. This will include the use of well known equipment as well as of new equipment. The best methods of performing common operations will be demonstrated; and also varied uses of standard equipment which are not known or appreciated by the average contractor.

We will also include in the program, discussions on business administration. It is the man at the head of the busi-

ness who either makes it pay or else busts it. There will be included in the program a great many valuable pointers for the head of the business, particularly the small one. Shop owners will be invited to bring their shop foremen and other mechanics to see these demonstrations.

Indiana is looking up. The sheet metal, furnace, and roofing contractors will meet this situation in a business like manner, if they take advantage of the opportunities for sound information offered by the State Association.

Paul R. Jordan,
Secretary.

Dayton, Ohio

Your query on city codes for gravity and forced warm air heating systems gives me sad misgivings for those hearty souls who are sponsoring them in their respective communities.

It is unnecessary for me to repeat my opinion on these matters. Suffice it to say that I have worked continually on a code for gravity warm air heating for the past thirty months. First, may I humbly make a few suggestions to other contractor groups which are still in the formulative stage of code legislation?

I can speak from bitter experience when I say that the first step should also be the most important step in creating any law covering the installation of heating systems: namely, be certain that every contractor who is likely to be affected by the passage of such a law be wholeheartedly for it. One may find that city governmental agencies will be hesitant to pass any measure which is opposed by any substantial group, no matter what reason is advanced for the opposition. However, all opposition will come from the men who least understand the benefits to be secured from installation codes; the uninformed and often illiterate.

May I illustrate, by using the example with which I am most familiar? Dayton, Ohio, a city of some 200,000 has a City Code covering all construction from sewers to skyscrapers, and including gravity warm air heating installations. We contractors were of the opinion that a new code supplementing the present laws was badly needed and conscientiously went to work. We worked diligently for

over two years without criticism or objection. When the completed ordinance was passed by our worthy commission, civil suits were filed against the Chief of Police, Fire Chief, Chief of Building Inspection, City Commission and City Manager by contractors who fell within the classification of the uninformed and illiterate.

Today, three months after the successful passage of our code, we are no further along than we were three years ago. In fact we are now in somewhat of a predicament as we have incurred the ill favor of several worthy men who pulled hard for our measure and were duly congratulated by us for what we thought was the successful culmination of our efforts.

I have merely used the above illustration to make clear the necessity of absolute cooperation between all members of the local industry who will be affected by a code. One heating contractor can make things mighty complicated for a group of fifty by filing an injunction against such a code after its successful passage.

If I have included a vein of pessimism in the foregoing, may I add a little sweet to the bitter by saying that our local Association seems to have benefited materially by the hue and cry which accompanied our successful struggle to create tranquillity out of confusion during the past two months. Attendance has increased steadily at our bi-monthly meetings and contractors are requesting admittance to membership.

Outside meetings followed by lunch and refreshments during the warm weather and dinner meetings at the present have also added greatly to the attraction. All members have their dues paid in full and are keenly looking forward to an open season on construction.

Ray E. Barrett,
Secretary.

Wisconsin

The 1936 convention of the Wisconsin Sheet Metal Contractors Association will be held February 3 and 4, 1936, in Milwaukee. Headquarters will be the Republican House.

No definite arrangements for programs or speakers have been made as yet, but complete announcements will be ready shortly.

Paul L. Biersach, Secretary.

Association Activities

New York

Many rumors have been reaching this office lately to the effect that five large foundries, who have cooperated with this association, have been paying for the regular issuance of these monthly bulletins. We wish to take this opportunity of stating that such assertions are malicious, false and untrue. The publication of our regular communications is made possible through the receipt of dues of members—and, incidentally, the dues are \$5.00 per year, per member.

A problem facing this industry which we believe is of even greater importance and seriousness than the mail order house situation, is the fact that foundries and manufacturers are selling air conditioning equipment to many outlets who are not sufficiently well informed to make the skilled installation that a condition air job calls for.

An example of the methods being pursued by some of the foundries has just been called to our attention. A foundry sometime ago made a blueprint of a condition air system to be installed in a prominent person's home. Rather than face a possible loss of the sale of their equipment they permitted an oil burner salesman, who had no heating experience, to figure the job. As a result this salesman presented a figure several hundred dollars lower than several legitimate heating contractors, and was awarded the job. He purchased the furnace through a jobbing company that had never handled this particular foundry's products, but had always, and still does, job competitive heating equipment. This salesman sublet the job and as a result a very unsatisfactory installation was made.

Another practice which should be eliminated is that wherein salesmen working for coal companies, in the course of their calls on home owners, attempt to gain a commission for repairs to, or replacements of, furnaces. We believe everyone should stand pat and refuse such commissions inasmuch as no such remuneration is made for the many times everyone of us has been instrumental in the placing of an order for fuel.

Also, many manufacturers of thermostats, etc., are selling coal dealers at prices which enable said dealers to sell such equipment for practically our cost. We see no reason why the names of such concerns should not be published in our bulletins.

The manufacturers of roll roofing, asphalt shingles, etc., are adding to the difficulties being faced by this Industry, by selling their products to automobile accessory concerns and other concerns of similar nature. These companies are on the same basis as the mail order house—but still the manufacturer expects the legitimate roofer to buy the same material from him at a greater

price than the accessory companies in a good many cases, are retailing it.

It might be of interest to our members to learn that this Association has become a duly incorporated organization. Our corporate name is "NEW YORK STATE SHEET METAL, ROOFING AND AIR-CONDITIONING CONTRACTORS' ASSOCIATION, INC."

Our incorporation permits us to purchase materials in carload lots and to buy, sell, mortgage, lease or otherwise own, control, maintain and operate real and personal property to better carry on the business of the incorporation.

Adolph Hesse, Secretary.

Ohio

A meeting of the Officers and Board of Directors of the Ohio Sheet Metal Contractors Association was held at the Hollenden Hotel Cleveland, Oct. 2nd. All members were present except Charles Grote of Cincinnati who was unable to attend. Among the various matters taken up by the board was the question of the 1936 Sheet Metal Convention.

It was decided to have the secretary take a poll of the various manufacturers and jobbers on the question—Shall we hold a convention in March, 1936 or wait until March, 1937?"

Some sixty letters were mailed out by the secretary on this question, and the result of the poll was approximately 80 per cent for a 1936 convention, 15 per cent for a 1937 convention and 5 per cent non-committal.

As Dayton had invited the Ohio Contractors to that city, the offer was accepted by the Board, and Dayton, Ohio will be the hosts to the Ohio Sheet Metal & Roofing Contractors in March, 1936.

Dayton has a reputation for putting on conventions that are long remembered and Director Ray Barrett and his helpers are already at work to make the 1936 gathering one of the finest in Association history.

C. M. Gundlach, Secretary.

Chicago

The attendance of our South End Sheet Metal Employers Assn. of Chicago remains very steady throughout the entire year, in fact, we had a one hundred percent attendance less than two months ago.

Your inquiry on State, County and City codes is very interesting to me. If all ordinances are lived up to and carried out like they are in the city of Chicago, I would sincerely advise and recommend no activity for that type of legislation.

Unfortunately in Chicago our warm air heating ordinance has become a football of corrupt politics, and if this is likely to happen in any other city,

every heating contractor should oppose such an ordinance as it is just another method of destroying our industry.

The plans of our association for the winter months are to solidify all the branches of our industry under the heading of sheet metal.

It is our purpose to compare our association with that of the American Medical Society. We have specialists in certain branches of our industry, such as warm air heating, air conditioning, steel ceilings, ventilation, blow pipe work and metal windows, as well as other general sheet metal work, yet they are all a part of the sheet metal industry.

Every doctor is a member of the American Medical Society, whether he specializes or practices general medicine, so should every sheet metal contractor belong to the sheet metal association.

J. A. Miedema,
Secretary.

Buffalo, N. Y.

The Buffalo Sheet Metal, Warm Air Heating, Air Conditioning Association held their regular meeting with a very large group of members present for the election of officers. New officers are:

President—Leo J. O'lear.
Vice-President—Wm. A. Gordon.
Secretary—Fred Frisch.
Fin. Sec.—Tim Cunningham.
Treasurer—George Adema.

Board of Directors

Max Reid.
Frank Minet.
Nelson Irons.
Wm. Eisle.
Harry Yost.
Herbert Ruff.
John Swzelling.
Barney Cummings.

Sergeants At Arms

Frank Heck.
Sam Rosen.

Membership Committee

Albert Roehrig.
Mr. Hoessel.
Mr. Ruff.

Sick and Entertainment Committee

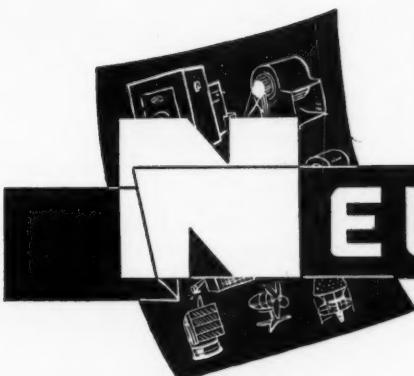
Max Reid.
Mr. Hoessel.
Mr. Ruff.
Mr. Smith.
Frank Karnath.

There has been a Committee appointed to work on having the Standard Code adopted in our City Building Laws. Frank Minet is Chairman of this Committee.

There will be an air conditioning school held about the middle part of November by this Association. Charles Lighthard, Heating Engineer, will be the instructor. A large group of heating contractors are waiting for this school to open.

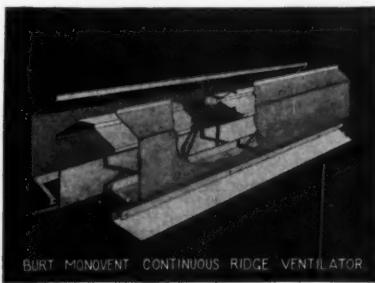
Our association wishes to extend thanks to the Du Page County Assn., also to the Sheet Metal Assn. of St. Louis for their splendid cooperation.

Leo J. O'lear, President.



● 214—Ridge Ventilator

The Burt Manufacturing Company, Akron, Ohio, announce a new Burt Ridge ventilator, known as the Monovent continuous ridge ventilator. The ventilator consists of two side pieces and two bottom pieces for installation on the roof, leaving an open top down the ridge. Beneath this under top there is an inside hood wide enough to carry moisture to the drains on the sides. The new ventilator will be made in sizes from 3 inch to 24 inch in standard 10-foot sections. Several variations of the basic mounting section can be obtained



BURT MONOVENT CONTINUOUS RIDGE VENTILATOR

so that the ventilator is suitable for mounting on a flat roof, pitched roof, on purlins, on saw tooth roofs and as the cap piece for skylights. Full information with detail drawings showing all sizes, general design and suggested methods of installation on various types of roofs, has been compiled in the form of a four-page leaflet. A complete discussion of the operating characteristics is also presented.

△ ● 215—Furnace Feeder

Taylor Equipment Company, 1924 Westwood Avenue, Cincinnati, Ohio, announce the "Tec" portable furnace feeder. The unit consists of a large drum mounted on easy rolling casters and containing a mechanical elevator and centrifugal type spreader. The hopper is filled with coal at the fuel bin and the unit rolled to the furnace where the spreader is placed in the fire-door opening. A thermostat controls the operation of the feeder. Coal is taken from the hopper, raised by the elevator and thrown into the firepot by the centrifugal spreader. A cone of fuel is maintained in the heating unit at all times by this unit.

For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 74 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1935 Directory

△ Indicates product and manufacturer not listed in 1935 Directory

NEW PRODUCTS

216—Spray Nozzle

A new spray-nozzle designed for humidification use, or for any place where spray with low viscous liquids is required, has been developed by the Rega Manufacturing Company, 79 Mt. Hope Ave., Rochester, New York.

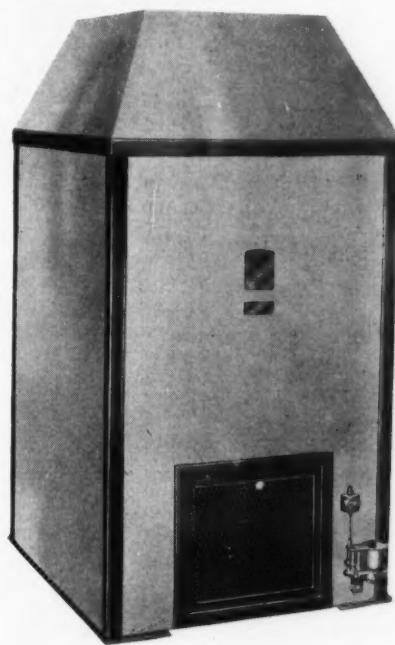
The nozzle operates on pressure of 35 lbs. or more and produces a very fine spray. It passes approximately 6 quarts per hour through the nozzle.

The orifice is automatically cleaned each time the water is shut off. This is accomplished by means of a spring action piston in the end of which is the orifice, and a cleaning pin. The piston moving forward when the water is turned on and returns to its original position by spring action when water pressure is released forcing the cleaning pin into the orifice.

The nozzle can also be furnished to impinge a fine stream on a baffle plate, operating on pressure of 25 lbs. or more.

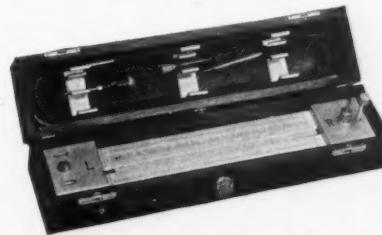
217—Oil Furnace

Lochinvar Oil Burning Products Corporation, 11921 Grand River Avenue, Detroit, Michigan, announce a new square cased oil burning furnace with an output of approximately 102,000 Btu. The furnace is of steel construction with a steel radiator, all seams welded, and equipped with the Lochinvar special burner.



● 218—Air Meter

Julien P. Friez & Sons, Inc., Baltimore, Maryland, announce the Friez Air Meter, an instrument designed for the direct measurement of pressures and vacuums of from .00125 to .50 inches of water and velocities in feet per minute of from 140 to 2832. The unit comes in a small wooden case, which contains a manually leveling



scale and liquid gage, which is read directly from the liquid. Suitable tubing, also extra supply of liquid and specially designed pitot tube are included in the equipment. The instrument can be used on either pressure or vacuum without recourse to elaborate calculations. Full information on the new unit together with recommended methods for using have been prepared in leaflet form by the manufacturer.

△ ● 219—Rustproofing

Rustproofing at low cost is claimed for Cromodizing, a new process of the American Chemical Paint Company, of Ambler, Pa. By preventing rust from forming beneath paint films, this treatment solves the problem of keeping steel units in serviceable condition. Cromodizing is claimed to protect any type of steel surface regardless of size, shape or previous processing.

Instead of coating the steel with a layer of phosphates, cromodizing changes the steel so that the surface currents that induce rusting are stopped. Steel products are dipped in a bath or sprayed with a solution of the chemical Cromodine. Only one minute is required. The metal is first cleaned and following the chemical treatment is rinsed and dried.

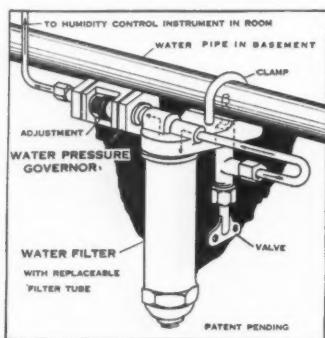
The process is said to form a protection that is as flexible and ductile as the steel itself and will not break and cause paint failure when the product is bent or distorted.

Paint applied over Cromodized steel is claimed to have a better luster, because there is no rough coating to absorb paint irregularly.

New Products

220—Water Valve

Monmouth Products Company, 221 East 131st Street, Cleveland, Ohio, announce a new water control valve to be used in connection with the company's recently announced evaporating



humidifier. The water valve is designed for clamping to the water supply line and contains a water-filter section and a water pressure governor between the filter and humidifier.

221—Water Operated Stoker

The American Home Stoker Company, Builders Building, Cleveland, Ohio, announces a water operated coal stoker requiring only a water connection. Rural water pressure systems make it available for the country as well as the city man. Counting three springs and a hydraulic diaphragm it has only nine moving parts. Simultaneous control of the inlet and outlet water is accomplished by flapper valve mechanism closely corresponding to the operation of an automobile vacuum tank.

A piston moving only $\frac{3}{4}$ of an inch each stroke keeps delivering a trifle less than a quarter of a pound of coal at a stroke. The speed of stroking can be regulated as frequently as once a minute or as infrequently as once in twenty minutes. Firing is through the regular fire door opening, the fuel is preheated and then discharged on a cone or sloping angle of repose.

222—Water Heater

Two hot water generators—one of the fin type, the other of the finger type—are announced by the Thomas Devlin Manufacturing Company, Burlington, New Jersey. The fin type heater has a capacity range from 30



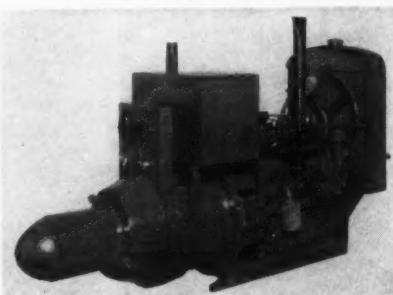
to 40 gallons in cast iron or brass and the finger type generator has from 30 to 60 gallons capacity in cast iron or brass. A small leaflet showing the two units and containing prices has been prepared by the manufacturer.

223—Controlaire

"Home Comfort" Furnace & Manufacturing Company, 2901 Elliott Avenue, St. Louis, Missouri, announce the "Home Comfort" Controlaire, a unit consisting of a standard steel "Home Comfort" furnace to which is connected a twin-wheel blower, several sections of air filter, space for cooling coils between the blower and filters, space for washer, all housed in a rectangular casing designed to take an oil burner, stoker or gas conversion burner. The casing is completely insulated. A feature of the unit is the radiation interceptor, which consists of an inner-steel wall which catches the radiant heat from the furnace and warms the return air. After picking up heat from the interceptor the air then passes inside the interceptor to take additional heat from the furnace proper. Suitable connections are made whereby air from the basement or from outside may be used as well as direct return air from the house. The new furnace will be made in four sizes ranging from 110,000 to 250,000 B.t.u. output for oil or gas and 97,000 to 217,000 B.t.u. output for hand-fired coal. The fan units range from 1300 to 3000 c.f.m. using $\frac{1}{4}$ to $\frac{3}{4}$ horse power motors and from 3 to 9 filter sections. *

224—New Welder

A new 200 ampere engine driven "Shield Arc" welder is announced by The Lincoln Electric Company, Cleveland, Ohio. This new model supplies a uniform current for welding with bare



or heavily coated shielded arc type electrodes in all sizes up to $\frac{1}{4}$ inch. The welding current range of this new machine is from 60 to 250 amperes. Its generator is the single operator variable voltage type with completely laminated magnetic circuit and equipped with interpoles. Requires no external reactance or stabilizer.

The welder is powered by a direct connected Waukesha 4-cylinder engine which delivers 23 H.P. at 1400 R.P.M. A gear driven governor maintains proper engine speed. *

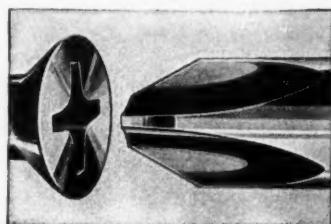
225—Boiler-Stoker Unit

Announcement is made of a new combination boiler and coal stoker, comprising units of the National Radi-

ator Corporation and Iron Fireman Manufacturing Company. The units have been selected for co-operative operation. The boiler will be made in a range of sizes with a suitable capacity stoker for each size. A day and night room thermostat is standard equipment. *

226—Recessed Head Screws

The American Screw Company of Providence, R. I., announces a line of case-hardened sheet metal screws with the Phillips recessed, self-centering head. A tapered recess, which exactly fits a tapered driver, takes the place of the slot in the conventional screw. This change is claimed to give faster



driving with less effort, provides better holding power, better appearance, reduced spoilage, fewer accidents, etc.

The sheet metal screw is said to prevent slipping sideways and provides three times as much purchase between the driver and the screw. Less than half the pressure is required; the driver guides the screw; and the screw may be set up tighter with no danger of the head breaking. The screws are made in flat, round, oval, and low fillister heads. Four sizes of drivers are necessary to drive the entire range of screw sizes, and two sizes of drivers fit the range of sizes most commonly used.

227—Repair Plug

A plug or rivet for making permanent repairs of large or small holes in liquid, air or vacuum containers has been developed and is illustrated here. It is made of a strong, ductile metal which expands as the hex nut is drawn down and a ferrule on the tip of the plug fans out, compressing a metal head on the inside of the container being repaired. By this means, the plug forms a seal in three



ways, and repairs made will hold up to 2000 lb. pressure and 900 F., according to the manufacturer.

They may also be utilized as anchor bolts for securing cabinets, machinery or other apparatus to stone, cement, brick, etc. The manufacturer—Multi-Seal Mfg. Co., P. O. Box 3900, Chicago, Ill.

News Items

Heating and Ventilating Exposition

The Fourth International Heating & Ventilating Exposition, the air conditioning show, will be held in Chicago at the International Amphitheatre, during the week of January 27, 1936. Reservations for exhibition space at this date point toward a new success high for the 1936 show.

A wide variety of heating, ventilating and air conditioning equipment will be presented. There will be exhibits of warm air, steam and hot water heating systems, refrigeration systems, central heating and unit heating, insulation materials, and precision instruments to provide regulation and control for every type of installation, whether in home, office or factory.

During the same week the winter meeting of the National Warm Air Heating and Air Conditioning Association will be held in Chicago, with headquarters at the Stevens Hotel, and also the 42nd Annual Convention of the American Society of Heating and Ventilating Engineers, headquarters at the Palmer House.

♦ Liberty Blowpipe, Louisville, Ky., Changes Name

The former Liberty Blowpipe Co. is now called the Liberty Engineering and Manufacturing Co., changing the name in October. The firm, directed by George N. Jackson, is very well known in the air conditioning and material handling field, being one of the first in Louisville. The firm has handled work as far west as Des Moines and in many parts of the middle west and south, for firms, manufacturers and governmental projects, municipal, etc.

♦ Reaffirm Simplified Practices

The Division of Simplified Practice of the National Bureau of Standards has announced that Simplified Practice Recommendation R29, Eaves Trough, Conductor Pipe, Conductor Elbows and Fittings, has again been reaffirmed, without change, by the standing committee of the industry.

This simplification program, which is concerned with the sizes and weights of eaves trough and conductor pipe, became effective July 1, 1925, and was reaffirmed, without change, in 1925, 1926, 1927, 1928, 1929, 1930, 1931 and 1932.

Copies of the recommendation may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

♦ Arkansas Firm Reports Good Year

Helena Sheet Metal Works, Helena, Arkansas, one of the large and old-established shops on the Mississippi River, with a large clientele in Helena and West Helena, report good business in Phillips and adjacent counties.

♦ Texas Centennial Exposition

A schedule showing rapid progress in construction of buildings for the Texas Centennial central exposition was released Oct. 9 by the management committee. Most of the structures will be completed March 15, 1936, according to estimates of the program. The Administration Building is 75 per cent completed. Plans for the Food Products Building are now in the hands of the low bidder and the contract will be executed probably Oct. 14, with work starting immediately, completion March 15.

Advertisement of bids on the Livestock Building No. 2 were posted Oct. 10 and bids were received Oct. 22. It will also be completed March 15. Working plans and specifications for the Electric Communications and Varied Industries Building were completed Oct. 25, advertisements for bids posted Oct. 26 or 27 and bids were received Nov. 12. Structure to be completed by April 15, 1936. Bids for the Petroleum, Travel and Transport Building were received Nov. 14; work to be completed April 28, 1936.

NEW NEW NEW!

OF COURSE IT'S

ANOTHER RYBOLT FURNACE

GREATER MORE SALABLE MANY FEATURES

Watch for it
next month in
American Artisan.
*You cannot afford
to miss it!*

GROWING TREMENDOUSLY in POPULARITY Every Day —

H&C No. 120 BASEBOARD REGISTER

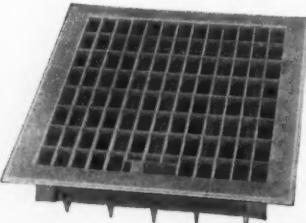


*Made to be
installed with
the Stackhead
Overlapping
the Frame*

Here are two of the newer items in the Hart & Cooley line that you, by all means, should investigate immediately if you are not already familiar with them. The rapidity with which installers throughout the country are turning to these new items demonstrates that they do possess decided superiority — features that make for greater customer satisfaction, good will and added sales.

Decide now to make your registers "go to bat" for you. Ask your H & C Jobber, NOW, to show you the No. 120 Streakproof Baseboard Register and the No. 210 Floor Register. They'll do a good job for you.

H&C No. 210 FLOOR REGISTER



HART & COOLEY MANUFACTURING CO.
Warm Air Registers **H&C** Air Conditioning Grilles
Regulator Sets Dampers. Chain
61 W. KINZIE ST. • CHICAGO • ILLINOIS

News Items

Contractor Moves Shop

J. J. Holland Tin Shop, Brownsville, Tenn., has lately moved to the corner of LaFayette St. one block north from Public Square and same distance east of former location. Mr. Holland has been active in the sheet metal trade of Brownsville about twenty years and operates the principal business of the kind in Haywood county.

Glass Houses for New Building

Thousands of home-makers soon will be living literally in "glass houses."

A favorite spot in the home for the glass block type of construction will be the solarium or sun porch, architects say. The reason is that glass blocks transmit and diffuse up to more than 86 per cent of the available light. At the same time, the glass prevents spotting of sun rays which come through it and reduces the heat of the sun's rays on the outside. Interior partitions will be given greater beauty by means of glass blocks while the dining room will be paneled with this material in many cases.

Even the basement will be no exception to the relentless trend towards adoption of the glass block in building activity. Laundries, furnace rooms and storage space will be partitioned with this material and it will be useful for partitioning recreation rooms because glass blocks deaden sound, the builders point out.

Sears Doubles Sales

Advance orders for household stokers already total twice the sales for 1934, officials of Sears-Roebuck & Company report. They estimate that stoker sales for 1935 will be approximately four times as large as sales of 1934.

Memphis Contractor Moves

George B. Harper, sheet metal contractor, who was located for many years on South Fourth St. has moved to 271 Court Ave. near the corner of North Fourth St. and as usual is doing a fine line of roofing, furnace, blow pipe and other sheet metal work.

New Literature

For your convenience in obtaining copies of new literature, use the coupon on page 74.

318—New Arc Welding Handbook

A revised and enlarged edition of Procedure Handbook of Arc Welding Design and Practice is announced by The Lincoln Electric Company, Cleveland, Ohio.

The new handbook contains 586 pages, divided into eight principal sections which deal with an important phase of arc welding. The text is written in a simple, concise manner and is profusely illustrated, there being over 700 illustrations consisting of detailed drawings and photographs. Practically every use and application of arc welding is covered.

The eight sections of the book cover the following subjects:

- Part I—Welding Methods and Equipment.
- Part II—Technique of Welding.
- Part III—Procedures, Speeds and Costs for Welding Mild Steel.
- Part IV—Structure and Properties of Weld Metal.
- Part V—Weldability of Metals.
- Part VI—Designing for Arc-welded Steel Construction of Machinery.
- Part VII—Designing for Arc-welded Structures.
- Part VIII—Typical Applications of Arc Welding in Manufacturing, Construction and Maintenance.
- Part IX—Advertising Section.

New Literature . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 74.

319—Furnace Burner Unit Leaflet

The Heil Co., 3000 W. Montana St., Milwaukee, Wis., manufacturers of the Heil oil burner, announce Bulletin No. 200-B covering the company's new furnace-burner unit, a new heavy-plate furnace with large fire travel, cased and furnished complete with an oil burner and full control equipment.

The text matter of the leaflet describes the furnace in complete detail with some history of the company and a history of the development of the furnace. A section of the leaflet is devoted to a description of the method of installing and operating with additional information on operating characteristics.

320—Fan Equipment Catalog

The Evry-Use Products, Inc., 258 Canal Street, New York City, has prepared a small catalog of the company's apparatus. The catalog shows illustrations and gives complete information on the manivane exhaust blower rated from 55 to 3000 C. F. M., either cased or uncased; the belted electric blowers from 950 to 4800 C.F.M.; the exhaust fan of the propeller type rated from 700 to 4100 C.F.M. and other miscellaneous products, such as automatic shutters, airplane-type propeller fans, circulating pumps, etc.

321—Sound Deadening Brochure

Deadening or reducing noise produced by mechanical equipment through the use of sound dampening or sound absorbing materials and by isolating vibrating mechanisms is the subject of a brochure "Sound Control of Mechanical Equipment" recently published by Johns-Manville, 22 East 40th Street, New York City.

It contains an instructive discussion of the problem of sound control in air conditioning systems, mechanical refrigerators, oil burners, metal furniture and other equipment, as well as a description of the various materials used in typical installations. Special treatment is given the subject of vibration isolation platforms designed for motors, fans and the like.

322—Burner-Boiler Leaflets

National Radiator Corporation, Johnstown, Pennsylvania, through its Oil Heating Division, 101 Park Avenue, New York City, announce two leaflets describing the company's new oil-boiler unit.

The unit is radically different in design and appearance and has been designed especially for the economical and efficient burning of oil. Full explanation of the new unit is contained in the leaflets.

323—Insulation Leaflet

The Wood Conversion Company, St. Paul, Minnesota, has prepared a small mailing stuffer showing the value of insulation in terms of inside shades, outside awnings, blinds and pressed board insulation. The leaflet is designed for consumer reading and shows how blinds outside of a window save a certain amount of heat transmission as compared to blinds on the inside. The value of awnings of different colors and design is also included. There is also some information on the heat saving qualities of outside wood shutters. Insulation applied to the attic floor, attic ceiling and cooling effect obtained by insulated attics equipped with exhaust fans are presented in the leaflet.

324—General Electric Gas Furnace Folder

General Electric Company announce a new folder, which is accompanied by a supplementary sheet presenting the new warm air, oil fired conditioner. The general characteristics of the unit are presented in the larger folder while the supplement covers tables of ratings, combustion and heat transfer characteristics, construction of the cabinet, ratings of the fan, motor, humidifier, oil burner, etc.



Perspire Less and Prosper More with MONCRIEF FURNACES

IT is easier to sell a Moncrief Furnace because you have a most complete line to sell from. Every Moncrief is the latest in design, finely finished, and priced to enable you to give your customer big value, and more profit to you.

It is easier to install a Moncrief Furnace because the contact edges of every section have been ground and fitted at the foundry to make smooth, gas-tight joints. No fitting required out on the job.

Send for literature and price lists.

The Henry Furnace & Foundry Co.
3473 E. 49th St., Cleveland, Ohio

Manufacturers of Cast Furnaces . . . Steel Furnaces . . . Air Conditioning Systems for Coal, Gas or Oil . . . Air Conditioning Appliances . . . Everything in Pipe and Fittings Used on a Warm Air Heating Job.



New Literature

For your convenience in obtaining copies of new Literature, use the coupon on page 74.

325—Insulation Folder

A folder presenting the use of Insulite for sheathing in the building of new homes has just been issued by The Insulite Company, Minneapolis, Minn.

The text of the folder points out the fact that Insulite used as sheathing serves a double purpose, providing both insulation and structural bracing strength. An illustration of a two-story frame home, shows the unbroken wall surface secured by the large sheets of Insulite.

326—Arc Welding Leaflets

Hobart Brothers Company, Troy, Ohio, announces two leaflets. One describes the Hobart booklet on Arc Welding—a 95-page manual presenting arc welding facts in detail. A second leaflet describes the new Hobart 40-volt, 125 ampere simplified arc welder. Illustrations show the new welder and methods of using it, accompanied by explanation of welding processes.

327—Ohio Jobbers' and Salesmen's Roster

The Jobbers' and Salesmen's Auxiliary to the Ohio Sheet Metal Contractors' Association is now mailing to members the 1935-36 roster of membership. The names of manufacturers and jobbers of sheet metal supplies, furnaces and fittings, tradepapers and others are included in the roster.

328—Stoker Leaflets

The Will-Burt Company, Orrville, Ohio, announce two new leaflets—one covering the company's line of domestic size stokers, with illustrations of the features of the stoker and explanation of its operation; the second covering

the Will-Burt commercial stoker with illustrations of the various types and drawings and photographs of the important mechanical parts.

329—Furnace Fan Sales Manual and Catalog

Russell Electric Company, 342 West Huron Street, Chicago, Illinois, announces a new leaflet covering the Hold-Heet fan-filter unit. The catalog contains suggested selling instructions and design methods. The company claims simplified methods for designing and selecting the unit whereby the proper size of fan-filter unit may be determined by dividing the Btu. losses of the room by the figure 250 or by a second method wherein the size may be determined by dividing the cubic feet of air delivery per minute by the figure 3, giving the number of square inches of leader pipe that will be required. Additional information is presented on the problems encountered where coal, oil or gas are used as fuel; necessary amount of filter area; automatic control; volume of air circulated; recommended methods for connecting the filter-blower unit to existing furnace casing; baffling; cold air returns; and other details.

330—Water Heating Coil Stuffer

Cleveland Heater Company, 1960 West 114th Street, Cleveland, Ohio, has prepared a small stuffer showing the Spee-Dee hot water heater, consisting of a U-shaped copper furnace coil with the necessary connections.

331—Oil Burning Unit Literature

Lochinvar Oil Burning Products Corporation, 11921 Grand River Avenue, Detroit, Michigan, announce four new pieces of literature showing the company's oil burning furnace, oil burning room heaters and oil burning water heaters. One piece of literature shows all of the oil burning units with prices and full descriptive text. Tables of specifications accompany each different product. Three individual pieces of literature describe in detail the water heater, room heater and oil burning furnace.

SELL LASTING SATISFACTION & SERVICE with COPPER

• H U S S E Y

Boost your sales . . . your customers' good will . . . and your profit. How? Simply by selling them "quality" instead of "price" materials. The old adage, "The best is the cheapest at the end" is certainly applicable to copper installations. They wear and wear, and long after the original expense has been forgotten their owner realizes what a fine investment he made.

Buyers are daily becoming more quality conscious and your suggestion that they use copper for long and lasting satisfaction will no doubt be in accordance with their own thoughts. Naturally there is a greater profit for you in copper jobs, so it should be worth the effort to sell your prospective client quality.

HUSSEY COPPER in sheets and manufactured products . . . HUSSEY SERVICE that insures prompt shipment of orders from convenient main plant and branch warehouses, will help "back up" your copper sales. So go after them . . . there are many who would buy on your recommendation.

C. G. HUSSEY & COMPANY PITTSBURGH, PENNSYLVANIA

DISTRICT SALES OFFICES

BALTIMORE
BUFFALO
CHICAGO
CINCINNATI

CLEVELAND
DALLAS
NASHVILLE
NEW ORLEANS
NEW YORK

PHILADELPHIA
PITTSBURGH
ST. LOUIS
SAN FRANCISCO

WAREHOUSES

CHICAGO
CINCINNATI

CLEVELAND
NEW YORK
PHILADELPHIA

PITTSBURGH
ST. LOUIS

With the Manufacturers . . .

Death of Edwin E. Dickinson

Edwin E. Dickinson, formerly president of the Boynton Furnace Company, New York City, and during the administration of President Rutherford B. Hayes, secretary to Vice-President Wheeler, died in New York City August 6 following a long illness. Mr. Dickinson was eighty-three years old and for much of his business life was actively associated with the manufacture of furnaces.

Armco Wins Exhibit Award

At the Industrial Exhibit of the Purchasing Agents Association of Pittsburgh in October, The American Rolling Mill Company was awarded a silver plaque for the most informative exhibit at the convention.

The judges declared the exhibit displayed everything from coffee pots to steam locomotives to show the application of its various sheet grades.

Temperature Control

Beginning in the newspapers in the principal centers in late September and early October, Minneapolis-Honeywell Regulator Company has run a series of large sized advertisements, the theme of which is "Buy Automatic Heating Now! See Your Distributor." These ads were for the definite promotion of automatic heating both for new and modernization projects.

Beginning early in October and running on into November, there will be another series of advertisements appearing in the newspapers of the major cities, again emphasizing the value of automatic heat and specifically stressing the importance of the Chronotherm for utmost comfort and economy in every such installation.

The third series will appear in national media, also carrying the automatic heat story and emphasizing the importance of the Chronotherm.

To supplement this publicity complete sets of printed matter, including an unusual and handsome salesman's portfolio entitled "Silent Servants," and consumer folders of all the necessary kinds have been prepared and offered to the trade.

Revision Prices of Forced Air Registers

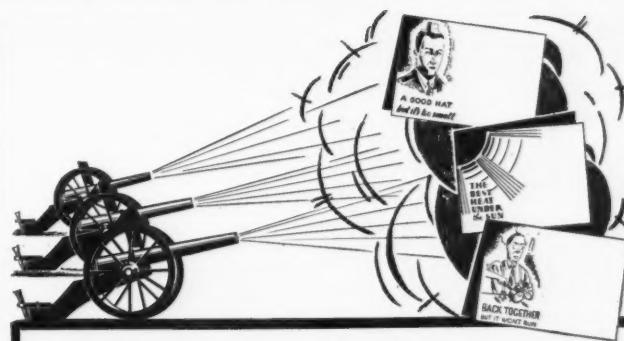
A revision in the list prices of forced air registers and grilles is being prepared for announcement about January 1, 1936. The proposed change will make it possible to apply the same base discount to both gravity and forced air goods.

R. & B. Sales Campaign for 1936

Richardson and Boynton Company, according to H. T. Richardson, Vice President, is laying plans for a forceful promotion campaign for the coming year. This campaign, according to Mr. Richardson, will include extensive advertising to the trade, and to the general consumer field.

"Richardson and Boynton," Mr. Richardson stated, "has always believed that the confidence of its representatives is just as important as the confidence of the buying public. We feel that it is only just to our faithful friends and associates to inaugurate even more forceful sales promotion and advertising in order to reap the full benefit of the turn in the national financial situation. We hope, through our consumer advertising, in national periodicals, to make the task of the contractor easier than it is at present.

"In order to consummate reorganization the company deemed it wise to apply to the Courts for assistance and therefore took advantage of 77-B to reorganize the financial structure. Within a few months we have been discharged from 77-B, with a clean slate and in a stronger financial position than ever."



A THREE SHOT Direct Mail Campaign to Help you Sell your Prospects

When we sell you a furnace we consider that it is only half sold. The sale is not completed until the furnace is installed in the home of a user. To help you keep furnaces moving into the homes of your prospects, to help you turn furnaces into profits is considered by us as a part of our job.

When you become a Marshall Caloric Furnace dealer we ask you to send us the names of your prospects. To your list, without charge to you, we mail three pieces of direct mail advertising. The first piece sells you as an expert at planning installations. The second piece sells you as an expert installation man. Not until the third piece do we talk about the furnace.

These pieces will help you sell yourself to your prospects. They will create confidence in you and confidence is the foundation of every sale.

Would you like to see samples of these mailing pieces? Then just mail the handy coupon below.

Marshall Furnace Company Marshall, Michigan

Heating and Air Conditioning Equipment
54 Years Continuous Service

Marshall Furnace Company, Marshall, Michigan

Send me a sample of the direct mail pieces and tell me more about the Marshall Cooperative Plan.

Name.....

Address.....

City..... State.....

AA-11

With the Manufacturers . . .

New Addition to Ryerson Jersey City Plant

Joseph T. Ryerson & Son, Inc., recently completed a new extensive addition to their Jersey City Plant, making available an additional 45,000 square feet of floor space. The new warehouse, a two story brick building, is heated throughout and has the latest equipment for the storing and handling of the finer steel products. Special racks keep the material in good condition. The heating system holds the temperature at a uniform degree preventing any condensation of moisture or sudden change that would affect the quality and finish of special steels.

Lau Suffers Fire

Lau Heating Service, Inc., Dayton, Ohio, suffered a serious fire which burned off the entire factory roof and ruined most of the finished merchandise. Fortunately, the company had practically completed arrangements for moving into larger quarters, so the move was made right after the fire. While shipments were delayed a few days, the company was shipping unpainted units within one week. The new quarters give practically 30,000 square feet of operating space on four floors in addition to the office quarters.

Lacey Heads Peck, Stow

Mark J. Lacey has been re-elected president and general manager of the Peck, Stow and Wilcox Company, Southington, Connecticut. The same officers and directors who have served during past years were also re-elected.

Republic Appoints Los Angeles Manager

George E. Clifford has been appointed District Sales Manager of Republic Steel Corporation in the Los Angeles, Calif., District. Mr. Clifford was appointed following the resignation of George F. Emanuels who has been in charge of Republic's Los Angeles office for several years.

Automatic Products Expands

The Automatic Products Company of Milwaukee, Wisconsin, manufacturers of air conditioning and other automatic control equipment, has added 5,000 square feet of floor space to its plant for manufacturing.

This addition, according to R. W. Johnson, President, is necessary due to the large increase in the volume of business, which is the result of the company's program of widening its field of activity.

Mueller Announces New Heater

The L. J. Mueller Furnace Company, Milwaukee, Wis., will have available for the market in the near future, a new self-contained, oil-burning air conditioning unit, for all types of residential heating and air conditioning.

This unit will consist of burner, furnace, blower, filters, and automatic humidifier, housed in a very attractive casing.

Schoedinger Celebrates 45th Anniversary

On September 15, F. O. Schoedinger, well-known Columbus, Ohio, business man, celebrated his 45th year in business.

Mr. Schoedinger began his business career when he purchased a hardware store located at 106 N. High St., September 15, 1890. The year following roofing and architectural sheet metal work were added.

The addition of tinner's, roofer's and furnace men's supplies, and the manufacture of steel ceilings necessitated additional space; and in 1905 the business was moved to the six-story building located 142 to 148 North Third Street.

Again larger shops and warehouses were needed. The plant formerly owned by the Kinnear & Gager Company was purchased and a new five-story building was erected. In 1920 the entire business was moved to its present location.

In celebrating the 45th business anniversary Mr. Schoedinger held an outing for his employees and their families. A feature of the outing was the forming of a 25-Year Club, eighteen employees being eligible for membership.

CANTON PERMANENT STEEL CEILINGS

There is a pattern for every room—stores, churches, schools and the home.

Make a plus sale by selling a CANTON Steel Ceiling for that new conditioned basement room. Adds an extra room to the home at a very moderate cost.

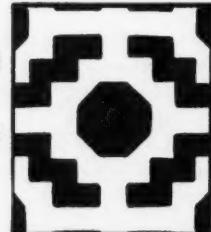
Sold through leading sheet metal jobbers.



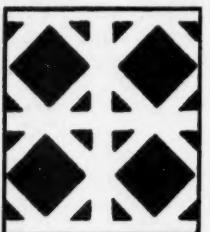
CANTON STEEL CEILING CO.
CANTON

Warehouse Service: 497 West St., New York City
and Canton, Ohio

Left: LACECANE



Left: CROSSCANE



WICKWIRE SPENCER perforated metals

The Clinton Works of the Wickwire Spencer Steel Company was the first plant in America to produce perforated metal. It has kept apace with each new development in the art of perforating metals and offers today, a service that is unique in its completeness. A few of the newer designs are shown in the new circular "Decorative Perforated Metals."

You will find it of value to you.

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd St., New York City
Buffalo - Chicago - Worcester - San Francisco
Send for this NEW Perforated Metals Folder.



WE TESTED IT "IN A HELL ON EARTH"



... and proved that Vernalloy possessed a 30 to 50% greater strength and endurance than ordinary cast iron . . . and Vernalloy is what you get in every Vernois Furnace.

When you sell Vernois Furnaces you not only offer your customers the advantage of this great metallurgical development, but a furnace that is the **HEAVIEST OF ITS TYPE BUILT TODAY**. It will last at least 1½ times as long as ordinary cast iron furnaces.

In Vernois Furnaces you will find centered one of the most convincing sales stories ever . . . and many dealers are cashing in on its producing qualities. They find they can present more intelligent . . . more logical and more economical reasons why people should buy Vernois . . . and customers must be agreeing for sales are mounting higher and higher every day. Write for our "Tested in a Hell on Earth" booklet . . . it will open the door to greater sales and profits for you.

All Vernois Furnaces may be purchased on the Vernois Easy Payment Plan . . . 3 years to pay at low interest rates.

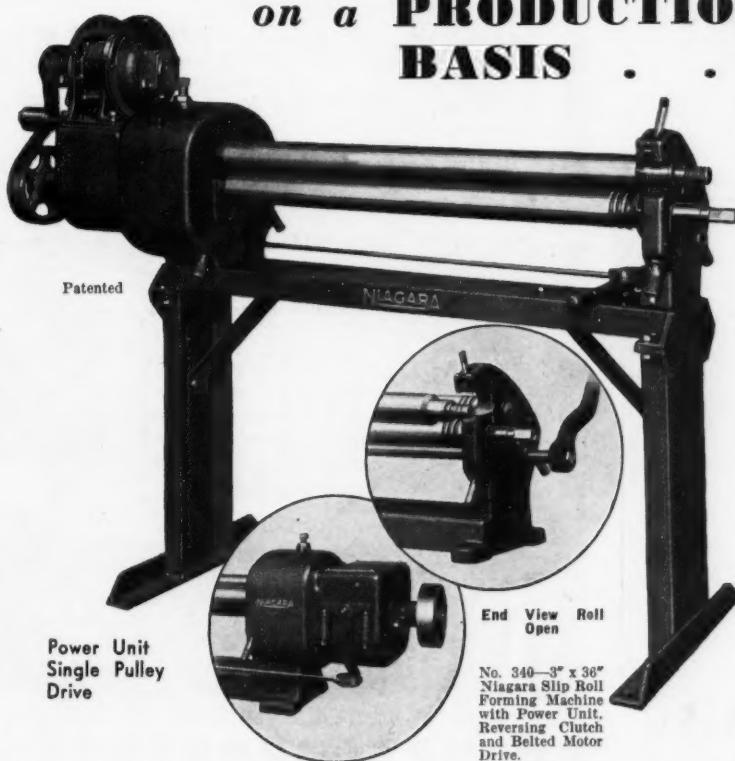


MT. VERNON FURNACE & MANUFACTURING COMPANY
Mt. Vernon

Illinois

NIAGARA Slip Roll Formers

*Put Your Cylindrical Forming
on a PRODUCTION
BASIS . . .*



Sheet Metal Men are manufacturing light and heavy pipe, stacks, drums, pail, tub and container bodies with Niagara Slip Roll Formers. The No. 340 Power Driven Model shown at the left is just one of the complete line of power and hand operated models made in light and heavy sizes for different thicknesses of material and various working lengths.

Finger operated quick trigger mechanism releases slip roll in a jiffy for removing the work. Slip roll swings open and closed without lifting. Rolls are adjustable for producing desired curvature.

Mail coupon for Bulletin illustrating and describing exclusive and patented features which make these Niagara machines make money for sheet metal men.



Niagara Machine & Tool Works
683 Northland Ave., Buffalo, N. Y.

Please send Catalog on Slip Roll Formers, also
 Folders Shears Groovers Machines for
 Turning, Beading, etc.

Name

Concern

Street City AAII

Baffling Practices

(Continued from page 17)

Number 7

C. J. Meyer, Joseph Meyer & Son, Inc.,
Buffalo, N. Y.

"It is difficult to suggest a type of baffling which will work equally well in all sizes and types of furnaces, but over a period of years we have found the type of baffle shown in Figs. 7 and 7A to be best suited to cast iron, round-cased furnaces.

"This baffle is very easy to fabricate and install because it consists of a plain sheet which extends from the floor to the bonnet ring. It is fastened to the casing by metal screws at the top and bottom. We find that a space of 4 inches between the outside of the radiator and the inner surface of the baffle is best. A hole through which air enters from the blower is the only opening in the upright baffle.

"The upper edge of the baffle turns over the radiator for a distance of 4 inches to direct the air flow into the center of the plenum and to cause a mixing of the air passing between radiator and combustion dome and the air passing around the outside of the radiator."

Number 8

Jay Barton, Nelson Co., Detroit

"It isn't possible to give definite suggestions on proper baffling without

knowing the furnace size, type of blower and its capacity, register air temperature, velocity, etc., but from numerous tests on baffles we have adopted the type of baffle shown in Figs. 8 and 8A as best for all general purposes. It combines simplicity of fabrication and installation with surprising efficiency in operation.

"As can be seen, the baffle consists of a pitched-in cone starting at a point level with the grates and extending upward and inward to a point about level with the top of the fire pot sections. The space 'A' will need to vary according to the velocity of air and amount of air and probably will vary with each size and make of furnace. This suggested skirt has been especially useful in low basements where high bonnets are impossible."

Number 9

J. A. Martin, Philips Heating, Ventilating & Mfg. Co., Los Angeles

"The baffling of a furnace, we have found, is not as important as the rating of the fan. If the fan is not rated to handle 25 per cent more air than the furnace is capable of heating under gravity operation the ordinary casing is adequate and no baffling is required. There is just so much heat to be dissipated. More air means air of lower temperature, but also better ventilation."

Copper House

(Continued from page 21)

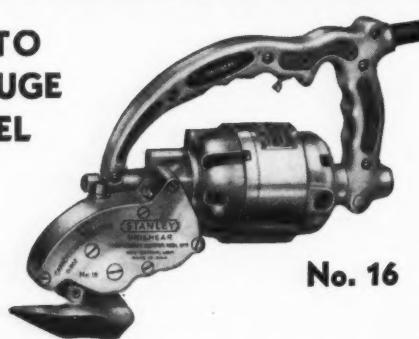
air mechanically filtered and cleaned throughout the year. This air conditioning system has been installed in all the principal rooms of the house, while rooms such as bath rooms and kitchens, closets and maid's room have been provided with concealed copper radiators recessed in the walls.

Copper alloys are further used in the bronze screens for all windows and doors, and in the heating pipes, and all the hardware, and in the lighting fixtures. The house is announced as weather-proof, rust-proof, fire-proof, lightning-proof, sound-proof and termite-proof.

Copper Houses has perfected plans for supplying copper sheets, and the patented system of joining them together with structural steel work, through the sheet metal trade, and will encourage the building of further copper houses in different parts of the country.

NEW PORTABLE UNISHEAR

CUTS UP TO
16 U.S. GAUGE
1/16" STEEL



A definite need has been expressed for this portable Unishear of intermediate capacity. It is ideal for use where the requirements are too severe for the "Mighty Midget" Unishear with its capacity of 18 U. S. Gauge Steel and not sufficiently heavy to justify the purchase of a No. 144 Unishear with its capacity of 14 U. S. Gauge.

Patterned after the "Mighty Midget," the No. 16 is surprisingly light in weight, sturdily built and easy to handle. It is 100% safe.

Cuts straight lines, angles, notches and curves to a minimum radius of 1 1/2". Speed up to 15 feet per minute.

Because of its large reserve capacity the No. 16 Unishear can be operated continuously as a production tool without ill effects.

Descriptive literature gladly furnished

STANLEY ELECTRIC TOOL DIVISION
THE STANLEY WORKS
131 Elm St., New Britain, Conn.

STANLEY UNISHEARS
MODELS AVAILABLE WITH CAPACITIES UP TO $\frac{1}{4}$ " BOILER PLATE

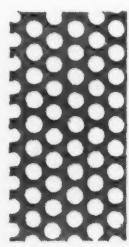
PERFORATED METALS

Every Sheet Metal Worker needs perforated metal in one form or another.

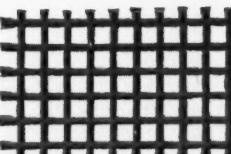
For processing food products and to withstand certain chemicals, perforated Stainless Steel and Monel Metal are much used.

Factory Safety Guards—For this service perforated metal has no equal.

For Grilles, Radiator Enclosures, Air Conditionings, Cabinets, we have many beautiful designs. Write today for information and prices.

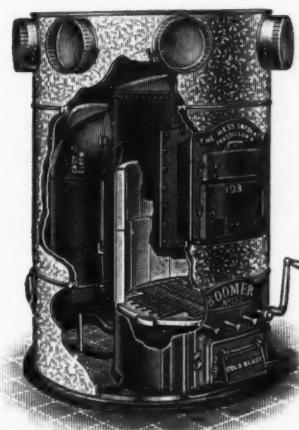


You'll like H&K prompt,
satisfying work and
pleasing prices
Perforators of metal since 1883
Send us your specifications



The Harrington & King Co.
PERFORATING

5649 Fillmore St., Chicago, Ill. Off. New York Office, 114 Liberty St.



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 22 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 22 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

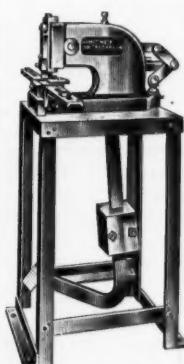
When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.
Massillon, Ohio



WHITNEY-JENSEN BRAKE
A DUAL MACHINE—
Can Be Used for Pan or Box Work by
Inserting Box Fingers.



FOOT PRESSES.
Like all Whitney tools, this foot press is built to give a lifetime of good service. Expertly designed and made of the best materials throughout.



IMPERIAL ROLLER BEARING PUNCHES. Offered in 3 sizes. Will work inside 90 degrees. Quick changing for punches and dies. No cams to wear. Stripping positive.

Write for complete catalog on Brakes, Punches, Shears, Angle Iron Machinery, etc.

WHITNEY METAL TOOL CO.
91 Forbes St. Rockford, Ill.

PROFIT WITH Nu-DRY FURNACE CEMENT

It comes to you in dry form . . . takes less material to set a furnace . . . DOES NOT CRACK OR POWDER WHEN FURNACE IS FIRED IMMEDIATELY AFTER APPLIED . . . will not shrink . . . keeps joints tight at all times . . . will withstand high temperatures . . . is not affected by temperature changes . . . and eliminates material losses for it does not harden in containers. In other words, it possesses all the requirements you have been seeking in a furnace cement. Try it . . . it will prove its worth as a real profit maker for you.

Prices and jobbers' names supplied upon request.

PYROLITE PRODUCTS CO.
Refractory Engineers
1221-31 West 74th St. Cleveland, Ohio

A 1935 SENSATION THE ACME HEATER "IT'S IN THE FINS"

**Every Warm Air Heating Contractor
Should Have the Acme Story on File**

The ACME has proven a sensational success in schools, churches, theatres, factories, hangars and all types of public buildings.

Recommend it for your next job on the strength of these outstandingly superior features:

- Especially Adapted for Air Conditioning
- Sturdy Construction
- Burns Any Kind of Fuel Efficiently
- Efficient Radiator Section
- High Ratio of Heating Surface to Grate Area
- Double-Steel, Insulated Casing
- Tested by Outstanding Engineer
- Backed by Strong, Reliable, Progressive Company

Use the coupon now for your copy of Bulletin No. 351

ACME HEATING & VENTILATING CO., Inc.
4224-6-8 S. Lowe Ave., Chicago, Ill.

Please send me complete data on the ACME HEATER.

Name _____

Address _____

City _____ State _____

Dura Specialties

(Continued from page 14)

bronze besides those in lighter metals. Housing numbers electrically lit. All told, over 200 separate household conveniences are carried in stock in the company's well lighted showroom.

To save printing expense in promoting the sale of these ingenious devices, the Dura booklets prepared by E. S. Black, exploitation head, carry plans and sections of each item. Black says this extra effort is more than justified by the satisfactory results and pleased expressions from patrons. Misunderstandings are averted, he reports. For tile setters, carpenters and plasterers can't go wrong with both photographs and sketched dimensions to guide them.

While a \$10,000 kitchen equipment job was being put through the other day, the president of the company walked down the production line. Some range hood angle frames were being trundled to the loading platform, each

frame about twelve feet in length with five-foot turns at each end. Wobbly and unwieldy they were being edged along by three men. "Stop"! ordered the president, "one man is plenty. Grab it at the point of balance and the rest of you go back to work!" A few minutes later the president came abreast of the big shears and gave the crew a lesson in proper feeding. Two mechanics had been lifting twelve foot lengths of $\frac{1}{2}$ -inch plate to the knife which was slicing 6 inches off the long way; they were stacking the cut sheets on the floor. As these would have to be subsequently picked up and placed on a truck, the official spotted a waste operation. He at once directed the gang to elevate an adjustable dolly to the exact height of the cutting table.

The watchful officials make such overhead-paring expeditions constantly. But contrast this activity with the solution of another production problem. To wit:

One local industry, a movie lot, reported that its circular zinc film containers were hard to

stack in the vaults and harder to ship. A solution was sought. Sensing that a potential market lay at the back door if the customer was given a bit of service, the Dura president told his designers to "go the limit" in evolving a workable pattern—a galvannealed, square box with flush folded joints and absolutely slick surfaces. "It costs us over \$3,000 in experimentation before we got the right die. Whether we'll ever get our money back is a question. But the fun and the personal satisfaction of having solved a ticklish technical problem was worth just about \$3,000.

The idea originated with Mr. John Nicholous, Chief of Laboratories, Metro-Goldwyn-Mayer Studios, who stated the cans being used were not fireproof, were corrosive, and were not water tight. With the able assistance of Mr. Nicholous and his assistant Dura Steel went to work to perfect a new film storage container, etc., which they finally succeeded in doing and which is gradually being adopted nationally by the Film Companies in their storage vaults."



VICTOR

FORCE AIR FANS

Powerful—Rugged—Dependable
Better Performance—Lower Cost

Here's a line of exhaust fans that give you greater value for your money than you can find anywhere else. They are built right and priced right—and they are guaranteed to give perfect satisfaction. Equipped with Victor's own super-powered motors, they will out-perform any ordinary fan. Sizes range from 6" to 16". Be sure to write for literature and prices today!

The Victor Heat Booster Brings the Heat Up Fast—Improves Heating Efficiency Greatly

Now, you can make any hot air system perform better. Pulls "cold air cork" out of pipes in a hurry—increases heat circulation—cuts fuel bills. Solves early morning heating problem—greater comfort for every furnace owner.

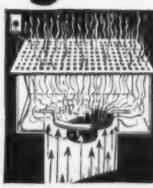
Easy to Install

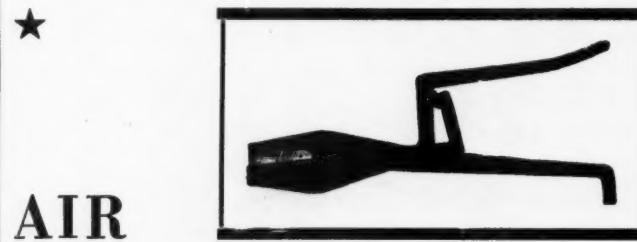
Floor type booster fits neatly under register—connects to nearest electric socket. No trouble—just a few minutes to install. Wall type booster mounted on beautiful maroon finished panel which hangs on grille. A great profit item for any furnace repairman—write for complete details now!

VICTOR ELECTRIC PRODUCTS, INC.
732 Reading Road Cincinnati, Ohio



Only **\$5.95** List





AIR CONDITIONING

*has unlimited possibilities
for YOU these days » »*

Air Conditioning, the latest and most outstanding agent of health, comfort, and convenience is creating a tremendous volume of business for sheet metal workers.

It creates a new standard of living and the user has been responsive to its appeal since its inception.

Get your share of air conditioning work, and incidentally

fortify yourself in your cutting and trimming operations by working with the Viking Shear, a shear with an appeal like air conditioning.

Built of the finest materials with special features built-in and backed by our guarantee you will find the Viking outstanding as a money saver on the small or large job.

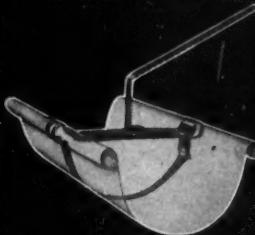
**The
VIKING
Shear**

Send for Particulars

VIKING SHEAR CO.,

ERIE, PA.

"BB" Quality



'THE RIVAL'
STRAP HANGER
for single bead and
double bead gutter

Build up a reputation with "BB" Products

CARRIED BY LEADING JOBBERS EVERYWHERE

Eaves Trough
Conductor Pipe
Conductor Fasteners
Mitres
End Pieces and Caps
Conductor Heads
Ornamental Straps
Ventilators, etc.

**BERGER BROTHERS
COMPANY**
229-237 Arch St. Philadelphia, Pa.

Who will get the jobs?

point the important question is, "Who is going to get this work?" *Will it be the furnace man who says, "I'll order a new casting for you right away. We should have it within from 3 to 8 weeks, if they still make your type firepot. You'll have to get along some how. We'll take your furnace down so that we'll be ready for the casting when it comes; etc., etc." . . . or . . . will it be the up-to-date furnace man who can say, "We'll be right up. We can repair your fire-pot in an hour with FIRELINE. You can have your fire going by noon. It will cost you about half as much as a new casting and with FIRELINE you'll save fuel, get more heat out of your furnace. FIRELINE will give you a hotter fire, will eliminate furnace gas, smoke and soot. Your fire will burn so completely that from now on your ashes will be all ashes."* Which man will get the business? There's no question there. It will go to the man with FIRELINE on hand.

Keep a 100 lb. drum on hand. It will cost you less than \$5, will pay a labor profit of over \$10 per hour. Most every jobber stocks it.

WRITE for FREE sample with full details, and description of sales helps.

Fireline Stove & Furnace Lining Co.
1866-L Kingsbury St.
Chicago, U. S. A.

(Copr. 1935, Plibrio Jointless Firebrick Co.)

FIRELINE



BRILLION, WARM AIR FURNACES



No. 100 Series

The 100 Series is a pipe furnace of two-piece radiator construction of the horseshoe type or two way travel. Radiator is convertible so that smoke pipe can be taken out at any convenient point. Casings can be furnished lined or unlined as an extra. Write for complete construction details.

MAKE STAUNCH CUSTOMERS

Once installed they go about their work of heating a home with precision, economy and efficiency. Their ease of operation and ability to withstand years of long hard wear make them in the buyer's estimation a sound investment.

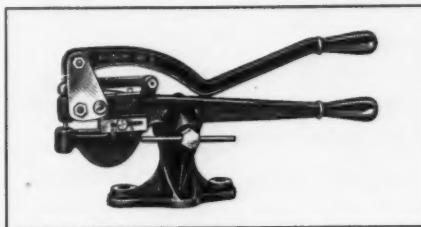
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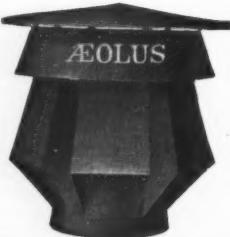
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318	319	320	321	322	323	324
325	326	327	328	329	330	331

Name Title

Company

Address

Statement of Ownership and Management of

"American Artisan" for October 1, 1935
Of American Artisan, published monthly at Chicago, Illinois, for October 1, 1935.

State of Illinois, County of Cook, ss: Before me, a Notary Public in and for the State and county aforesaid, personally appeared F. P. Keeney, who, having been duly sworn according to law, deposes and says that he is the business manager of the American Artisan, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Keeney Publishing Company, Chicago, Illinois.

Editor, J. D. Wilder, Chicago, Illinois.

Managing Editor, J. D. Wilder, Chicago, Illinois.

Business Manager, F. P. Keeney, Chicago, Illinois.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Keeney Publishing Company, 6 North Michigan Ave., Chicago, Illinois. Stockholders: F. P. Keeney, Chicago, Illinois; W. J. Osborn, Fairfield, Connecticut; R. P. Wettstein, Chicago, Illinois; C. E. Price, Chicago, Illinois; R. A. Jack, Cleveland Heights, Ohio.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

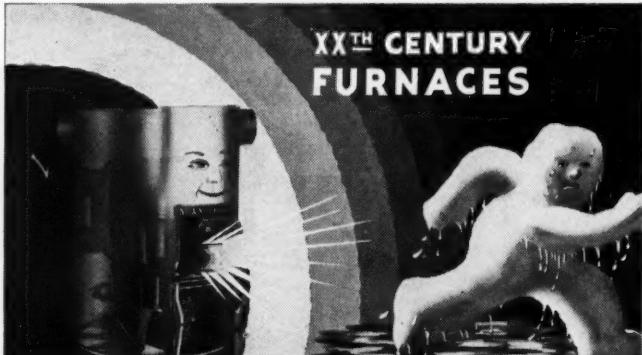
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

F. P. Keeney,
Business Manager.

Sworn to and subscribed before me this 1st day of October, 1935.
(My commission expires February 10, 1938.)
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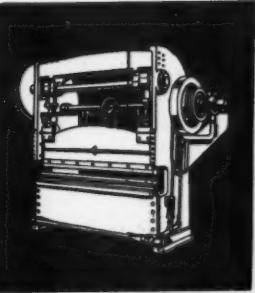
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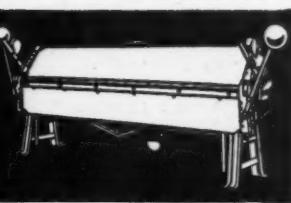
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(Continued from page 22)

cated, and a line drawn horizontal here will show that the hole in the end is much lower than the corresponding rivet hole in the front.

Each space will show a different variation in the location of the holes due to the curvature of the miter line. It is important that all bends be made very carefully. If the curve is great the notches at the space between 3 and 4 should be closer together. Since the bend will be in

a straight line the distances between points should never be too great.

New Booklet by F. H. A.

"Loans up to \$50,000" is the title of a new booklet released by the Federal Housing Administration.

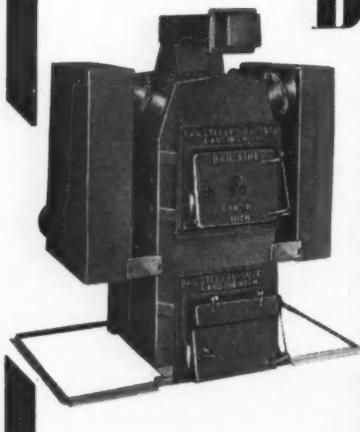
Adequate illustrations depict various types of building before and after modernization. A portion of the booklet devoted to "answers to your questions" comprehensively outlines the system by which borrowers can obtain this type of loan. The booklet points out also that larger loans are, to a large extent, obtained on terms similar to those which govern the smaller loans.

The funds are private funds obtainable from commercial banks, etc., and are repayable on monthly installments up to a period of five years. Basic differences in the system of obtaining credit, however, include the putting up of collateral wherever required.

Properties eligible for loans up to \$50,000 are multiple family dwellings, hotels, schools, colleges, orphanges, hospitals, office, business and other commercial buildings, industrial and manufacturing plants.

Copies of this booklet (FHA No. 180) are available at the Federal Housing Administration, Washington, D. C., and at State and District Federal Housing Administration offices.

Don't Be Fooled By Looks



When you decide on a line of heating and air conditioning *looks* is not all that counts—it will pay you to look inside the casing and find out how efficient and modern the heating plant is.

It is easy to put a beautiful casing on a 1910 model furnace, but what you should sell your customer to uphold your reputation as a dealer of honest merchandise is a line that will give better efficiency, more service and longer life.

Dairelle casings have the appearance—They are well designed and beautiful, and inside the casing is a 1935 model, modern efficient heating plant, with large radiating surfaces with down flue travel.

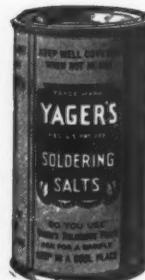
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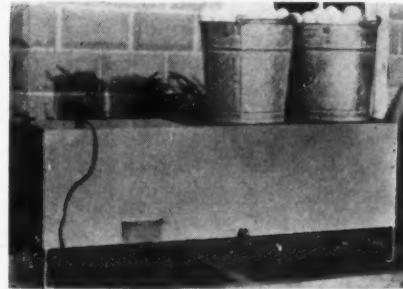
We make a complete line including bar, solid wire, drop and pellet solders and babbitts.



An Egg Cooler

The photograph shows an egg cooler, made with a heavy gauge steel body, invented and now being placed on the market by two Coatesville, Penna., egg men. The egg cooler is used to take the body heat out of eggs immediately after they are gathered by poultrymen.

A small motor is placed in one



end. Moisture drawn up from a pan in the bottom and mixed with air is blown into and through the baskets of eggs, cooling them and making them more salable at the egg exchanges. The unit has been tested and proved over a year's time. The machines are now being sold by Kendrick Souders and Harry Adams, of Coatesville. They report the poultrymen are very well pleased with them.

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4 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. One inch \$3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

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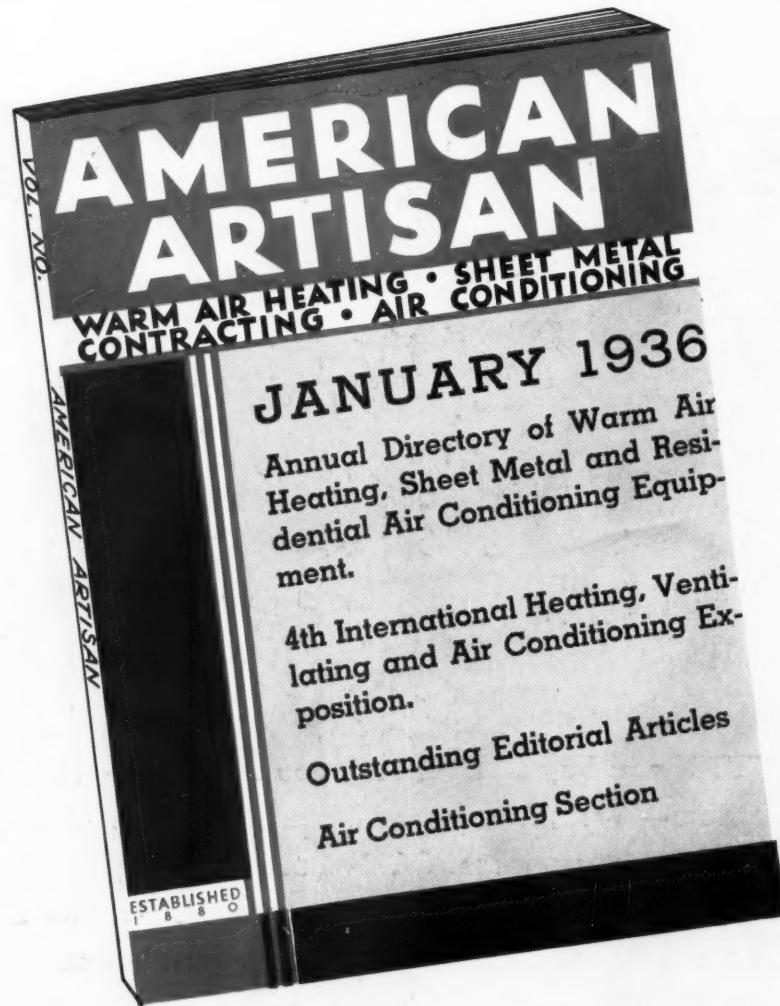
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